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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CLII. No. 2997.] LONDON, OCTOBER 20, 1920. [72nd Year. Price 8d.

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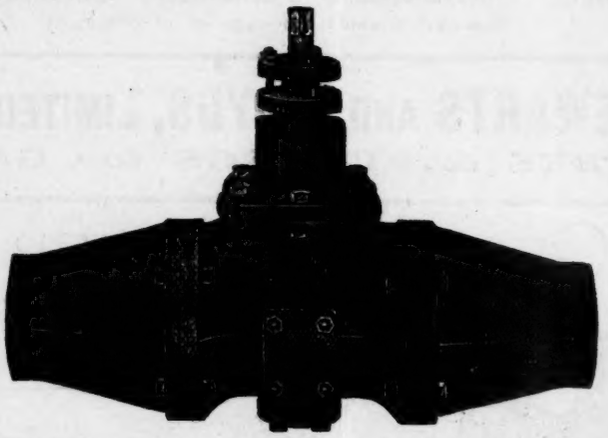

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CLII., No. 2997.] WEDNESDAY, OCTOBER 20, 1920. [72ND YEAR.

EDITORIAL NOTES.

The Coal Strike.

THE Miners' Federation took the fatal step at the end of last week. The mines of the country have been quiet since Saturday, and are not yielding of their wealth. Nearly a million and a quarter miners and boys are idle; only the enginemen and those who are needed to keep the mines from being flooded are at their posts. Coal output is being lost at the rate of round about 4,800,000 tons per week; and all over the country every day now sees its industrial workers a day nearer unemployment—some are already at that state through the necessity for conserving available coal stocks. The strike, we are now told by the men who are guilty of promoting, fostering, and urging the taking of the steps that have led to this criminal act against the nation by one section, is to be fought out to the bitter end, unless the Government capitulate on the one remaining condition of the miners' extremist leaders—that an advance of 2s. per day or shift shall be conceded without reasonable inquiry. The whole of the people of the country, other than the coal miners and their negligible number of sympathizers who are out to wreck, pray that the Government will continue inflexible to the claim that a majority in the Miners' Federation have any right to present claims and demand their fulfilment without impartial investigation, to which other sections of the industrial world willingly submit, and non-compliance with which in the case of the miners would constitute them a privileged class. To give way now would simply mean that further demand would be made, and the same tactics would be repeated, with all the uncertainties to which the country has been subjected the last few years, and of which it is utterly tired. No blame attaches, but the fullest praise is due, to the Government. They have been patient, diplomatic, conciliatory, and have exhausted (as the Premier said) every effort to avert this great calamity to the country and its trade. All that they have done that is objectionable to the miners is that they have stopped short at abandoning, and so abusing, their position as trustees of the nation. The Miners' Federation entered upon this contest knowing full well that those who have brought about the contest are to-day the despised of the majority of the people of the country for having left untrodden the alternative avenue to the datum-line which the Government offered in the reference to an impartial tribunal. To-day they stand at the bar of a greater impartial tribunal—that of the nation; and their verdict is shown by whole-hearted support of the Government. The community is prepared to go through much in defence of constitutional government and orderly procedure.

The strike is a victory for the extremists in the direction of the Miners' Federation; but they do not at the moment appear to be at all anxious for public recognition. They are trying to shield themselves behind the diaphanous curtain provided by the result of the ballot on the datum-line, and not on a reference (which they declined to face) as to whether the alternative course should be taken of submitting the question of wages to an impartial tribunal. The ballot on the datum-line gave a majority of 453,670 in favour of its rejection—635,098 votes being recorded against, and only 181,428 for acceptance. Upon this the delegates from the districts last Thursday confirmed, by 154 votes to 27, the recommendation of a majority of the Executive of the Federation, that the strike notices should expire as from last Saturday. The recommendation of the Executive and the voting of the delegates demonstrate the preponderating weight of the extremist element in the miners' organizations. To have gone before an impartial tribunal would have pushed the tactics of the extremists into a back place; and that, at this juncture in the country's difficulties, is just what they do not want. It is thus fully manifest that among these men despotism has the upper hand, that there is no respect by them for common interests, and that the claims of humanity make no impression upon them. Proof of this is found not only in their vote for a strike, not only in their refusal to submit the wage question to an impartial tribunal, but in their local counsel to the miners that they should reject the datum-line scheme, and not accept it even temporarily, as suggested by Mr. Smillie, as a bridge to more settled conditions of output and wages, although acceptance and an output on a level with the March quarter would have given them a wage addition equal to the 2s. per day claim, and a little more work would have augmented the 2s. The realizing in their own arbitrary fashion of the 2s. (which could have been obtained by increasing output, or by proving the justness of it before an impartial tribunal) is the supreme consideration of these misleaders of men; the misery, distress, and suffering that will fall upon the whole people, including women and children, are secondary considerations. At the same time we do not for a moment believe that the datum-line could have been more than a temporary expedient; for no common datum-line scheme which provided for equal increase of payment to men, applying to an extensive industry in which work and conditions vary so much in degree, could have done justice to good and bad worker alike. The two redeeming features about it were: There was in it, as an expedient, an incentive to greater production; and it levelled to a common basis the, from the working point of view, good and bad pits and seams, and so ironed-out the difficulty—for the hewers only—of unequal conditions of work. But it ignored individual effort. However, the ballot rejects what is (when details are worked out to fit conditions) the fairest principle in all wage methods where it can be made to apply—payment on production. The strike, it is said, is to be fought out to the bitter end. It will, we venture to think, be a very bitter end for the Federation. But it is hoped it will have the good effect of implanting greater wisdom where the plotting for the strike shows little has place to-day.

In the present catastrophe, the attitude of the other members of the Triple Alliance and of the Parliamentary Committee of the Trade Union Congress was the subject of much speculation at the end of last week and the beginning of this. Meetings have been held; and the railway delegates are conferring to-day. At the time of going to press, nothing definite has been done. The unions appear to be awaiting the result of the debate in the House last evening. But among the labour chiefs outside the Miners' Federation, the hope of mediation seems to be strong.

Emergency Orders.

Now it is the duty of every individual, every organization, and those engaged in any form of industry to aid the Government to a victory over those who would ride rough-shod over all national interests and constitutional methods, and would impose upon the country political dictation. The gas-works of the country have already been preparing to the best of their ability to render aid by stocking coal at a heavy price; and the extra time that has been given by the negotiations with the Miners' Federation and the taking of the second ballot has in this respect been very useful. Even now stocks are none too large with first a strike, then the disorganization of deliveries that will follow, with finally the maximum demand for gas and coke that comes with the dark wintry weather. The stocks will now day by day dwindle; and if the strike lasts long—one miners' official predicts a six-week strike—some of the country gas-works

will find themselves totally cleared of material for gas making. But, generally speaking, stocks will be found sufficient for the strike. Naturally, as a precautionary measure against the unforeseen, the strictest economy will have to be exercised at once. The only certainty about the present position is that there will be no more deliveries, other than those on rail or afloat, or stocks waiting to be loaded, until mining restarts, and then time will elapse before deliveries are again normal.

The Board of Trade in their Emergency Orders (which came right on top, and so showed preparedness, of the Federation instructions to give effect to the strike notices) have issued directions to gas and electricity suppliers. Realizing that gas undertakings have, when coal supply is not forthcoming, pre-eminence as fuel suppliers, their first instruction is that they are to manufacture and supply gas in such a way as will enable them to spread the consumption of their supplies of coal over as long a period as possible, while still supplying gas of serviceable quality. This puts all gas undertakings back to the war position in relation to the calorific value of gas and pressure. They will have no difficulty in complying with the instruction, and in informing consumers as to the regulation of their burners to meet the lower calorific quality of gas. The rationing of coal to householders will no doubt in some directions increase the demand upon gas undertakings for domestic purposes, though *per contra* it is hoped the major part of the consumers will do their best to help in the struggle by economizing. Some perhaps will only do so from the fear that the power will be exercised of cutting-off supplies of gas where there is waste. There is also the order to discontinue all outside advertisement or display lighting, and of any inside advertisement or display lighting in shops, and to limit the use of gas and electricity for power. The latter provision is one that should be dealt with as lightly as possible, as limitation of power means limitation of employment. Nothing more need be said as to the authority conferred upon gas undertakings by the Emergency Order. They may be relied upon to do their utmost to use their position to serve the community, and to assist in defeating a section of autocrats who seek to bring into subjection to their wills the appointed Government of the people.

Making Applications—Two Authoritative Pronouncements.

CONFERENCE is paving the way to applications for Orders under the Gas Regulation Act; but there are some gas undertakings that want to get home quickly. At times the "longest way round is the safest way home." The Central Executive Board of the National Gas Council some time ago came to the conclusion that the safest procedure in making applications would be to submit to the Board of Trade representative applications—representative more or less of regional conditions—from different quarters of the country; and in this way, in their opinion, a firmer road would be constructed along which the other undertakings might be able to pass. For example, principles might be established by thrashing-out certain points that are bound to arise in connection with the applications that have leading place in consideration. At the same time, the Central Executive Board of the National Gas Council have no desire to dictate the policy of gas administrators in the matter of making applications; but they do feel it would be politic in the interests of the whole industry that some form of procedure should be agreed upon. In our opinion, this is decidedly the best course; and it is hoped that it will be generally adopted. Meetings have been, or are being, held in each district with this in view. Time, however, passes. We are nearly three weeks now from Oct. 1, when the Board of Trade would have been prepared to receive applications had rules, schedule, and model forms been available in time. But they were not. The difficulties of getting on to sure ground in new work of this kind are more than they are generally conceived to be; and it was better to get matters into definite shape before stepping-out than to make a muddled start. The unavoidable delay has, of course, meant the deferring of the carrying-out of the proposals of the Central Executive Board of the National Gas Council. However, once get things into good swing, and then developments and the change-over should proceed at a good pace. It is observed that secretaries and accountants of various gas undertakings represented on the Central Executive Board were invited to attend the last meeting in order to consider questions of accountancy arising out of the Act. We hope that district conferences of such officials will be arranged, so that any valuable information is made available to all associated with undertakings in the membership of the Council.

In connection with the making of applications for Orders, there are two matters of considerable importance over which there has been some question in the gas industry. We recently submitted them to the Power, Transport, and Economic Department of the Board of Trade, and asked their guidance. They have courteously replied, so that the points may be taken as definitely determined. The first one is as to whether applicants for Orders under Section 1 of the Gas Regulation Act can adopt, in lieu of the sliding-scale, the South Metropolitan plan of a minimum dividend and division of profits as endorsed by Parliament in the Company's new Act [see "JOURNAL," Aug. 18, pp. 340-1]. The reply of the Board is that "they do not regard Section 1 " of the [Gas Regulation] Act as enabling them to authorize " an alteration of the basis of the sliding-scale." This therefore means that those who desire to secure the change will have to proceed by Act of Parliament; but we anticipate that the general feeling will be that it will be better to get an Order in the first instance, and leave this particular revision (if desired) till the time comes when it will be necessary to approach Parliament for a new Special Act. The second point particularly interests non-statutory companies. The inquiry has been made as to whether such companies can make application for Special Orders under Section 10 of the Act. The reply of the Board is that "non-statutory companies can apply for Special Orders " under Section 10 of the Act, and such an Order could fix a " standard or maximum price per therm without requiring "a subsequent application for an Order under Section 1." This pronouncement will give much satisfaction.

Provisional Testing for the Heat-Unit Basis in South London.

NOTHING has yet been heard as to who are to be the Gas Referees under the Gas Regulation Act; but we should naturally anticipate that the Metropolitan Gas Referees—Prof. C. V. Boys, Mr. W. J. A. Butterfield, and Dr. J. S. Haldane—would receive the first, and in all likelihood have received an invitation to take up the larger work, which obviously will be of a more onerous and responsible character than their functions have been hitherto. These functions have been important as applying to the Metropolitan area; but their results have been appropriated and applied throughout the United Kingdom. The Gas Referees of the future will be the recognized gas prescribing and supervising authority for the whole kingdom. It is learned, however, from the letter we publish to-day from the Board of Trade, that no definite appointment has yet been made, and that the Metropolitan Gas Referees are still in existence. In this capacity, and in conformity with their duty, they have issued what are shown to be, on the face of the provisions, merely a temporary notification as to the testing of the gas supplied under the terms of the South Metropolitan Gas Act of this session. The Company brought the Act into operation at the beginning of the current quarter, and declared the calorific value of the gas they propose to supply at 550 B.Th.U. Hence the need for immediately framing testing directions, which, in the whole circumstances, can be only of a provisional nature. About them there is nothing that is indicative of what will be in the future. The existing testing-places are continued; and the sulphuretted hydrogen test remains in force. Section 21 of the Company's Act gives them the right to additional profits for exceptional purity; and the Referees are proposing to prescribe the mode of testing the gas in order to ascertain the average proportion of carbon bisulphide in it as soon as this testing is required for the purposes of the section. The Company have, it will be remembered, placed themselves under an obligation, during a period of two years from the passing of the Act, to supply gas in which the amount of inert constituents shall not exceed 20 p.ct., for the subsequent period of two years 18 p.ct., and thereafter 15 p.ct. The inert question is to be the subject of special inquiry, in accordance with the Gas Regulation Act; but whatever happens as a result of the inquiry, the Referees will in any event have to make prescriptions for the testing for inerts in the case of the South Metropolitan Company. The mode of testing

for pressure is to be the same as was prescribed by the Referees in 1918.

What the gas industry will be looking for with the greatest eagerness is missing from this temporary prescription. The Referees are not prepared at present to prescribe a calorimeter for continuously measuring and recording the calorific value of the gas supplied. This will occasion no surprise. It is not a matter for light determination to prescribe a calorimeter which is to be the officially recognized form. Determination must rest largely on experimental investigation. Therefore the Referees propose to sanction the installation and trial in one or more of the testing-places of the Company of a recording calorimeter of any type which the Referees, or the Company, or the Controlling Authority may think will satisfy the requirements of official use; and they have already taken steps in this direction. This will be valuable to the Referees, as observation is to be made by them of the work of the trial installations; and this will serve to guide them in prescribing recording calorimeters for official use at a later date. To bridge over the experimental time, or the time between now and when a recording calorimeter will be officially enthroned, existing calorimeters are to be used in making testings of the calorific value of the Company's gas. The average of the calorific values (following the wording of clause 14 of the Company's Act) ascertained by all the testings of the gas made on any one day at any testing-place is to be deemed the calorific value of the gas supplied by the Company on that day at that testing-place. There are to be three testings every day, Sunday included; and the interval between two consecutive tests is to be not less than three hours. As will be seen by the notification (which is published in full in this issue), there are other interesting points regarding the testing for calorific value. Directions appear as to making reports, including the progressive calculation of the average calorific value for the quarter. The means by which the results of the tests shall be made available to the public will be prescribed later on.

This notification is all in the nature of an expedient; and it throws no light upon what will be the ultimate form of the prescriptions, nor as to the selected apparatus. The Referees, as intimated, have not been definitely appointed under the Gas Regulation Act; and the new conditions of gas supply have created such an upheaval in gas testing that those responsible for the making of prescriptions cannot carry out the work without due exploration of requirement, sufficiency, and reliability. There was bound to be something in the nature of an experimental stage.

Our Manufacturers and the Gas Regulation Act.

To the manufacturers of gas-producing plant and of gas-consuming appliances, the Gas Regulation Act is in a double sense as important as to the makers of gas; and the interest of the manufacturers of plant and appliances is highly important to the suppliers and to the consumers of gas. The concern of all has a mutuality, indivisible and certain. We are confident that before long the new conditions in relation to gas production and utilization will have to be the subject of joint conference, consideration, and decision on the part of those responsible for production and sale. The Board of Fuel Research, in their original report on "Gas Standards," remarked: "It seems desirable that, "before any legislation is undertaken, the representatives "of consumers, producers, and makers of fittings and burners should jointly decide on the standardization of burners "in appliances for a limited number of calorific values. It "is suggested that four standards may be sufficient: 400, "433, 466, and 500. If these are regarded as minimum "figures, the adjustment in each case should admit of an increased aeration to suit gas up to the next higher standard." Apart from the discussable point as to the minima suggested for initial calorific powers, we have not heard that any action has been taken upon this suggestion. So far as the position is visible at the moment, we are going along as though the only things that matter are the obtaining of Orders on the heat-unit basis, declaring calorific value according to individual conditions, and making arrangements for the production of as much gas as is possible per ton of coal handled as will comply with the declared calorific value, and as is consistent with the financial interests of the concern, as governed by the market values of secondary products. The question of making some modifications in the structural design of appliances in order to meet the largely varying conditions that will come about, and to provide the consumers with the highest efficiency under these conditions, has entered very little into public discussions from the side of the gas suppliers. Of course, there will be no sudden revolution in gas supply; the line of change to lower calorific values will take a reasonable gradation; and this no doubt is what is anticipated by the manufacturers of appliances. But in these days there should be evidenced a certain amount of anticipation. Nevertheless, although we do not hear much as to what the manufacturers are doing in respect of bringing the fittings of their appliances to an order that will meet a good range of conditions in gas supply, and will provide for interchangeability of injectors, regulators, and nozzles as time passes and changes to new calorific values and compositions come about, we may be sure that they are taking notes, and that their technical staffs are busy on researches which will affect their practices, and be ultimately to the advantage not only of the gas industry and the consumers, but of themselves. This work we say is no doubt quietly proceeding; and we shall probably not hear much about it until there is more pronounced guidance by the declaration of calorific values, and more precise knowledge as to gas composition. Anyway, we throw out the hint to the Chairman of the Council of the Society of British Gas Industries (Mr. Cyril G. Davis), that at the November meeting of the members, there would be an opportunity of showing the gas industry that the Gas Regulation Act and all that it foreshadows have a large place in formulating new manufacturing policy and practice.

The manufacturers of gas-producing plant are well on the way—indeed, up to current requirements—in helping the gas industry in the matter of producing more B.Th.U. per ton of coal handled, and in raising the efficiency of plant, all of which will be reflected in the price per therm. Never was this so much needed as to-day, with costs what they are, and competition vigorous. In this respect the manufacturers of gas appliances should realize their obligation to the manufacturers of gas-producing plants, for the price per therm is a cardinal feature in their future prosperity, as the price of their own goods is another. That the manufacturers of gas-producing plant are well abreast of present needs was seen, although somewhat incompletely, in the paper presented by the Society of British Gas Industries at the meeting of the Institution of Gas Engineers last June. We then heard what the individual firms have accomplished in the production of more efficient plant—more efficient in gas yield and heat conservation, the latter of which means a lower fuel consumption in relation to the total work done. Of steaming charges we heard both in the paper and in one of the reports of the Gas Investigation Committee; and in the latter it was seen that steaming does not detrimentally affect to any appreciable extent the quality of the secondary products, while it actually appreciates certain of them. We also heard, in conjunction with the Society's paper, of the application of waste-heat boilers. And information was also given of a mixed-gas plant—with attractive features, if all works out in practice as hoped for. What we did not in the paper hear anything about was the considerable help given by separately produced water gas in augmenting the yield of B.Th.U. per ton of original coal, nor of the progress of complete, or practically complete, gasification, which process some important undertakings are now trying. Enough was heard, however, to show that means of gas production are available which will help undertakings to take progressive advantage of the opportunities afforded by the Gas Regulation Act.

Reverting to the makers of gas appliances, we have no doubt there is not a point made by Mr. James W. Wood, in his research report to the Gas Investigation Committee, bearing upon the future need of gas appliances, that has escaped the notice of the manufacturers. One thing is certain that, acting co-operatively, they will claim from the manufacturers of gas that the supply must be of an order that will suit not only low-temperature operations but high-temperature ones. It is fortunate in one respect that the composition of gas required for the high-temperature purpose of lighting is the composition of gas that is needed for furnace work, because the makers of the latter are those who manufacture such low-temperature appliances as cookers and water-heaters, in which, so long as the necessary number of B.Th.U. are supplied to do the work, the composition of the gas matters very little. The facts of the position concentrate the interest of all. Then again it is clear that appliances should be sent out fitted for a calorific value and

constitution of gas within a given range, the ends of which range need not be so close as those suggested by the calorific figures mentioned by the Board of Fuel Research Committee. But a desideratum is that the vital fittings of such appliances should be interchangeable *in situ*. This matter is one that should be considered in connection with that of standardization. Perhaps it is being so considered. Closed doors, however, sometimes prevent the leakage of information, though the industry would much like the intelligence that all concerned are pulling together to the objective of designing and constructing appliances that will meet the needs under the widely varying new circumstances. No gas appliances should be sent out to-day—not even boiling-rings—without they are fitted for regulation; and no boiling-rings at the top of gas-cookers should have bars in the paths of the flames breaking up the latter, and causing heat waste by conduction. The heights of utensils from boiling-ring nozzles will have to receive attention with gas giving shorter flames. There are to-day boiling-rings which will give between 50 and 70 p.ct. efficiency. But many such appliances give an efficiency between 40 and 50 p.ct.; and this is largely due to the scant consideration bestowed upon the details. The makers of gas-fires will note from the Gas Investigation Committee's report of last June that the composition of gas within very wide limits does not cause any considerable difference in the radiant efficiency of gas-fires, provided that the mechanical construction of the fire will allow the same number of B.Th.U. per hour to be supplied to the radiants. In some remarks at the Institution meeting, Mr. Wood stated that there was no reason why the radiant efficiency of gas-fires should not be increased to 66 p.ct., simply by paying better attention to the radiants, injectors, and regulation. Radiants especially should be of an order that will fit the flames.

These are all matters of moment in connection with the coming change, and the large adoption of gas for domestic heating. They indicate much work for the manufacturers of appliances to be getting on with to meet the conditions to which the Gas Regulation Act is giving birth. There are not only the appliances that are now being made which should bear evidence of forethought as to approaching change, but an equally and highly important thing is that manufacturers will find as time passes that there will be a considerable demand for parts to effect conversions to adapt existing appliances to the new conditions.

Consolidating Subscriptions.

Diverse opinions are held as to whether it will be a politic thing to consolidate the subscriptions to the National Gas Council and the British Commercial Gas Association, including a sum for the research work of the Institution of Gas Engineers. Some administrators of gas undertakings prefer one course; some the other. Whichever method is adopted, it comes to the same thing. Evidently, however, the weight of opinion is on the side of consolidation of the two subscriptions, and through one cheque getting rid of the dual calls for money. From the minutes of the Central Executive Board of the National Gas Council, it is seen that the principle of a joint subscription has been agreed to.

The Right Policy.

It is a largely accepted fact to-day that in industry, there must be, to secure the best work and peaceful conditions, a stronger blending of control, direction, and work; and the worker must be given representation and participation which will satisfy him that in the system of joint-stock enterprise there is equality of interest between those who jointly provide the stock of money for carrying on the business and those who jointly provide the stock of labour—whether in office or on works or district. The South Metropolitan Gas Company have gone further than any other concern in the gas industry in promoting these conditions. The Chairman of the Company (Dr. Carpenter) was himself at one time one of the ordinary members of the Company's official engineering staff, and step by step he went upwards. Mr. Frank Bush, one of his colleagues on the Board, was for many years Secretary; and other members of the directorate are the elected representatives of the workers. This alone is a combination of which the employees of the Company may be proud. The new Act gives the whole of the workers a right to equal participation with the ordinary proprietors (of whom the workers form part) in a calculated amount of the surplus profits, after the ordinary proprietors have received the statutory minimum dividend, and the consumers have had the advantage of a charge lower than the standard price per therm. We have to-day the gratification of announcing that Mr. F. M'Leod, who has been in the service of the Company for forty-six years, has made another ascent in his official career, and is now the General Manager of the Company. Mr. Frank Day, who has been with the Company thirty-five years, has been promoted to the joint office of Secretary and Chief Accountant. To both congratulations are offered, with the best of wishes for success in their new spheres of responsibility. We look upon these appointments as something more than a recognition of long service. While it is partly this, and while it is an encouragement to the staff to regard the highest positions in the Company as coming within their legitimate aspirations, such advancements are in fulfilment of a policy which does more and more to make a consistent whole of control, direction, and work. It is the right policy.

The Token Value of the Penny.

It was mentioned last week that it was the idea of Mr. W. W. Townsend that the Mint authorities might be approached for the purpose of seeing whether, in view of the large demand there is for pence for gas prepayment purposes, a nickel or aluminium coin of the value of 3d. could not be made. We see that the Decimal Association have initiated a movement for increasing the token value of the penny; and it is stated to be receiving strong support. If the increase were made, it would cut away some of the argument advanced by Mr. Townsend, as it would lighten somewhat the quantity and weight of coins deposited in meter-boxes for any given quantity of gas. But it would not go so far as he proposes. The scheme of the Decimal Association is that there should be 200 pennies to the pound sterling, instead of 240, which would increase the value of the penny by 20 p.ct. There would be twenty shillings to the pound as now, but 10d. in a shilling, 5d. in sixpence, 2½d. in a threepenny piece. The sixpence and the "threepenny piece" would have to be renamed. Working in tens would be very useful; but we hope gas undertakings will not hold-up the bronze coin put in their prepayment meters in the hope of securing a good haul out of a speculative 20 p.ct. appreciation.

Sharp Colliery Practices.

It is not a satisfactory thing to learn that there are collieries that have appointed factors and sales agents with the object of securing a commission on factorage. The addition of 6d. to 9d. per ton of coal that results from this practice, as numerous gas undertakings can testify, is not an amount that can without protest be lightly and willingly borne in these times. It is understood that complaints regarding the matter have been lodged with the National Gas Council, and that it has been taken up with the proper authorities.

A Big Super-Power Station.

It was somewhere in the Barking area that the old Coalite Company buried a large part of their hopes. We believe it is on the same ill-fated ground that the County of London Electricity Supply Company are intending to build their new electric power station. The Electricity Commissioners are now considering the scheme which, it is anticipated, will cost (with the trunk distribution system) some 4½ millions sterling. The station it is proposed shall contain three 33,000 KW. turbo-alternators. The London County Council, the local authorities owning electricity concerns, and the other London electricity companies are opposed to the project, and are preparing a joint scheme. The decision of the Electricity Commissioners will be awaited with much interest. We wonder whether the promoters are looking to Beckton as one of their sources of fuel supply?

Gas Coke Exports.

Speaking of gas-works as sources of fuel supply, there is no reason, so long as sufficient stocks are held and the local consumers can get all the coke they want, for the high-handed proceeding of certain District Coal and Coke Supplies Committees in refusing to allow coke to be exported. The Committees in question seem to have been acting without any sufficiently good cause. The National Gas Council have taken up the matter with

the Mines Department, the Midland Co-Ordinating Committee, and the District Committees. Deputations to Local Committees are being arranged.

Electrically Generated Gas.

Electric cables can be generators of gas as well as conveyors of electric energy. There have been some outstanding instances of this; and it arises through electrically generated temperature in the cable acting upon its insulation. The gas given off has particularly violent explosive properties, and is very offensive. It looks as though this is what happened on Tuesday evening last week in the neighbourhood of Acton and Shepherd's Bush, when a long length of pavement was blown up. It was found (according to a newspaper account) that an electric cable had fused, had taken fire, and was blazing furiously. The explosion was due to gas. What was the nature of the gas? As the cable is reported to have been "blazing furiously," there seems little doubt that the cable contributed all the necessary elements for promoting an explosion, assuming the presence of sufficient air. It was not until the cable was disconnected, and the flames extinguished, that the pyrotechnic displays ceased. The day may come when such demonstrations by electricity will suggest to some inventive mind a means of utilizing electric current for generating gas for town supply. But an eye will have to be kept on the fuel account for generating electricity for this purpose. Sir William Ramsay has passed from among us, or he might have been trying something of the kind now that the war is over.

The Extra Charge for Washed Coal.

In the first directions issued under the Mining Industry Act, it was stated that, owing to the complaints made as to the inadequacy of washed coal, and with a view to securing its greater output, an increase not exceeding 2s. 6d. per ton in the price chargeable had been allowed. Gas undertakings rebelled against this new imposition. Some collieries were already supplying washed coal without extra charge; and there was a probability that without effective protest the maximum charge would become general. The Central Executive Board of the National Gas Council made an effective protest, and now report that the members of the Coal Association have decided to forego the charge.

OBITUARY.

THOMAS GARDINER MARSH.

It is with regret that there has this week to be recorded the passing away of another old and well-tried friend—Mr. Thomas Gardiner Marsh, who (aged 68) died on Sunday, the 10th inst., at his residence, Westholme, Cheadle Hulme, near Manchester. The interment was on Thursday at All Saints' Church, Stand, Whitefield.

A well-merited appreciation of Mr. Marsh, from the pen of "F. T.," appears below.

An Appreciation.

By "F. T."

By the death of Thomas Gardiner Marsh, there has passed away one more of that small band of stalwarts whose energy, breadth of vision, and faith in their profession contributed much in enabling the gas industry to weather the difficult times of thirty or more years ago. The present generation of gas engineers will not be able to fully appreciate the work he did, as for the past ten years or more he has not occupied the stage as he did previously; but many will be left who will remember the vigour with which he fought for any idea that he considered of real advantage to the gas profession.

Born at Lancaster 68 years ago, he was educated at the Lancaster Grammar School, and afterwards joined his father, who had removed from Lancaster to commence meter-making in Oldham. About 1880 he made the acquaintance of the late Mr. Thomas Thorp, of Whitefield; and together they developed many instruments and appliances that made Thorp and Marsh's names respected wherever gas was manufactured and used. It is interesting to note that in the present age, when signed and sealed agreements are broken with impunity, Thorp and Marsh worked together all their lives without any agreement whatever; and neither endeavoured to take advantage of the other.

Among the many inventions designed and put on the market by these two investigators may be mentioned pressure raisers, domestic governor burners, pressure recorders, regenerative lamps, rotary and discount meters, photometers, &c. But the most important of all was the penny-in-the-slot meter; and it is by his advocacy of this that Mr. Marsh will be best remembered, and with which he would have wished his name to be associated.

To those who knew him intimately he was a staunch friend, generous to a fault, and a most interesting companion. His fund of recollection was remarkable; and no man could be better company when once started on relating his experiences of commercial travelling in his early days, and the introduction of new apparatus.

It is interesting to know that the first slot-meter was put in at Liverpool, and, as usual, scoffed at—most engineers remarking that, though things were pretty bad, they had not yet come down to selling gas by pennyworths. Such was the prejudice and fear of accidents, that Mr. Marsh and friends had to specially insure the houses against risk of fire caused by the inefficient working of this new-type meter. Before many years had passed, however, the slot-meter became a recognized piece of apparatus; and it was often Mr. Marsh's boast that he caused a new minting of coppers.

As a salesman, he had few equals; and if he had been content to form or join a big company and reap the benefits of his introductions, he would have amassed a much greater fortune. But his delight was in discovering new wants in the industry, developing them with Mr. Thorp, and then endeavouring, with all his might, to persuade all others to think like himself.

He was one of the organizers of the Society of British Gas Industries, and did valuable work for that now flourishing organization in the early days, when gas engineers were not quite sure whether or not they approved of its formation. Swimming and yachting were his favourite pastimes; but his real interest was in his work.

Mrs. Marsh, who survives him, has been a real helpmate; and those who have known him intimately realize how fortunate he was. As he himself has often remarked, he would long ago have ceased his pilgrimage here had it not been for her constant attention and loving care.

May the industry long produce such men, who have foresight, energy, determination, and ability, together with a faith in the future of gas that will cause them to be optimistic prophets, and not without honour in their own house.

PERSONAL.

Preferment for Mr. M'Leod and Mr. Day.

In order to provide for the fulfilment of the additional duties arising out of post-war conditions, Mr. F. M'Leod has been appointed to the position of General Manager, and Mr. Frank Day to that of Secretary and Chief Accountant, of the South Metropolitan Gas Company.

Mr. H. Hughes, of Swindon, has been selected to succeed Mr. W. J. Budd as Manager of the Melksham Gas-Works. Mr. Budd, after having occupied the position of Manager and Secretary for more than thirty years, has been elected a Director. Mr. A. G. Whittaker has been made Secretary.

APPLICATIONS UNDER THE GAS REGULATION ACT.

Sliding-Scale and the South Metropolitan Alternative—Position of Non-Statutory Companies.

We recently put to the Board of Trade three questions referring to the Gas Regulation Act upon which readers of the "Journal" have expressed a desire to be enlightened. The inquiries were:

1. Will it be possible for companies making application for Orders to substitute for the sliding-scale or maximum price the South Metropolitan plan of a minimum dividend and division of surplus profits (when prices per therm are below the standard) between consumers, stockholders, and workers?
2. Will non-statutory companies be able to apply for Special Orders under the Act, and (if so) will this constitute them statutory companies, and thus enable them to make application under section 1 of the Act for the adoption of the heat-unit basis of charging?
3. Is there any information that can yet be given as to who will be the Gas Referees and Chief Gas Examiner under the Act, and as to their prescriptions respecting the recording calorimeter and conditions of testing?

The following reply has been received; and for it we thank the Board:

Sir,—With reference to your letter relating to the above-named Act, I am directed by the Board of Trade to state that—

1. They do not regard section 1 of the Act as enabling them to authorize an alteration of the basis of the sliding-scale.
2. Non-statutory companies can apply for Special Orders under section 10 of the Act, and such an Order could fix a standard or maximum price per therm without requiring a subsequent application for an Order under section 1.
3. The Board hope to be in a position to announce the appointments of a Chief Gas Examiner and Gas Referees at an early date.

I am, &c. (Signed) H. F. Carlill.

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board.

A MEETING of the Central Executive Board of the National Gas Council took place on Tuesday last week, at No. 30, Grosvenor Gardens, S.W.—Mr. D. MILNE WATSON in the chair.

THE GAS REGULATION ACT.

The accountants and secretaries of the various gas undertakings represented on the Central Executive Board were invited to attend the meeting, in order to consider questions of accountancy arising out of the Gas Regulation Act. It was explained that, though there was not the slightest desire on the part of the Council to attempt to dictate a policy to boards of directors of gas undertakings, it was nevertheless felt to be most desirable, in the interest of the whole industry, that some form of procedure should be agreed upon. It was thereupon resolved that meetings of members of the Council should be held in each district, and that a certain number of cases should be selected in the first instance to make application to the Board of Trade.

JOINT SUBSCRIPTION.

The principle of a joint subscription to the National Gas Council was agreed to, which would cover subscriptions of gas undertakings to the British Commercial Gas Association as well as the Council, and, in addition, provide a sum for the Institution of Gas Engineers for research work. The Finance Committees of all three bodies were present to state their case.

COAL-PRICE QUESTIONS.

A letter was reported from the Mines Department, with reference to the now-expired Coal (Pit's Mouth) Prices Order and Direction, 1919, that any undistributable small balances held by gas undertakings in connection with this rebate to domestic consumers of gas, should be returned to the Mines Department.

With regard to the extra 2s. 6d. per ton on washed fuel, which was authorized by the Mines Department, it was reported that members of the Coal Association had decided to forego this charge.

EXPORT OF COKE.

It was complained that a number of gas undertakings were refused licences to export coke, even though all the conditions as to holding a sufficient stock and satisfying local demands were complied with. The Council have been taking up this matter strongly with the Mines Department, the Midland Co-Ordinating Committee, and the District Coal and Coke Supplies Committees; and deputations to local Committees are being arranged.

BENZOLE RECOVERY FROM GAS-WORKS.

The question of the recovery of benzole from gas-works was discussed; and members were referred to the Council's monthly report for September [which will be published in a few days] for full particulars of costs &c., as given by the National Benzole Company, Ltd.

RAILWAY RATES.

With regard to railway rates, it was agreed that the interests of the Council should be watched at the sittings of the Rates Advisory Committee.

FEDERATION OF BRITISH INDUSTRIES.

The following were appointed to represent the Council on the Grand Council of the Federation of British Industries: Messrs. D. Milne Watson (Chairman), Stanley Jones (Commercial Gas Company), A. E. Broadberry (Tottenham District Light, Heat, and Power Company); A. A. Johnston (Brentford Gas Company), and F. W. Goodenough (Gas Light and Coke Company).

ELECTRICITY SUPPLY MEMORANDA.

Westminster Public Lighting Contract.

THERE are some electrical men who have been hoping that the differences between the Westminster City Council and the Gas Light and Coke Company over the conditions of the street-lighting contract would lead to the eviction of the electrically much-detested high-pressure gas lighting in the West-end. Their desires and hopes have come to grief. Nothing of the kind is going to happen. The Council and the Company have composed their differences, and an amicable settlement has been arrived at. In consequence, the Company have withdrawn their notice to terminate the contract. The City Engineers and the Works Committee of the Council regard the settlement as quite satisfactory; and the Council have endorsed the recommendations of the Committee. The high-pressure gas lighting in the West-end is to continue; and Pall Mall will still support the verdict of Alderman G. W. Tallents (the then Mayor of the City of Westminster), as reported in the "JOURNAL" for Nov. 4 last year [p. 239], that Pall Mall was an example of what "he considered to be the best-lighted street in London—possibly in the world. The light was admirably diffused. It was efficacious in lighting-up the traffic; and it was pleasant to the eye, which was something in a street."

Factories and Workshops Conditions.

The report of the Chief Inspector of Factories and Workshops (Mr. R. E. Graves, C.B.E.), on a superficial glance, looks much as it did in pre-war days. But the careful reader finds that in substance it is changing. This is only natural, because war time has been an eye-opener in connection with the conditions of work in all industrial premises. Considerations, though they can hardly be called new, have arisen, and have been forced into official cognizance; and there will be large benefits in this to industry generally, and to workers in particular. At the same time, before there are any official expressions of opinion or recommendations upon new points, in respect of lighting, heating, and power, we hope the Chief Inspector and his staff will get matters into true perspective, and make themselves thoroughly acquainted with all sides of the questions from the points of view of competitors—for example, gas and electricity. We are as keen as the factory inspectors in desiring that industrial premises shall be equipped in the best possible manner, having regard to efficiency and economy, and scientific application. There has confessedly been much too much traditional rule-of-thumb application hitherto, and not sufficient scientific order. But what has been is not the ground upon which to base judgment; the ground for this purpose is what can be. Gas can be as scientifically applied as electricity for lighting purposes; and, if scientifically applied, it can be useful in factories for more purposes than lighting. Light is required in the winter time, and so is heat. Gas lighting gives both, and the heat can be utilized to promote ventilation. The electricians sneer at this. The physical fact remains, and can be demonstrated. On a recent chilly evening, the writer went into an electrically lighted drawing-room that (with windows closed) had been occupied some three or four hours. Too early in the season for a fire, going into the room from the fresh air, it was close and the air stagnant. If the room had had a simple ventilating opening at the top, and the lighting had been by small unit incandescent gas-burners, the atmosphere would have been totally different, as the movement of the air created by the burners and the upward flow of the heat from them would, given a ventilating opening, have made a vast difference. Electricians consider paint and whitewash more than the health of human beings; and, as to the paint and whitewash, damage is usually electrically estimated by the conditions promoted by the old heavy consumption flat-flame gas-burners, and by gas fat with hydrocarbons—not by modern conditions in both respects. What applies to rooms applies to factories and workshops. This is one respect in which official view might be lengthened.

Glare and the Workers' Eyesight.

It is stated in the report that progress is generally recorded in lighting both by electricity and gas; and diffused ceiling lighting appears to be coming more and more into vogue. This is said to be a great advantage, as with properly placed lamps there is no glare or shadow. The flickering arc lamp, too, is disappearing; and the lamp which, with a want of candour and truth, has had the appellation "half-watt" applied to it, is taking its place. This lamp is described as the last word in efficiency; and it gives a brilliant light for a small energy consumption. Unqualified statements of this kind in official reports create false impressions, and so mislead. The energy consumption per candle power of these lamps—particularly in the lower units—is not so small as is represented; and, per candle power at the working level, it is further augmented by the fact that one cannot convert the light from direct to reflected without some loss of illumination per unit of energy expended. Moreover, the lamps do not maintain their original efficiency; and the life of the lamps is less than that of the metallic filament variety. The increased illumination is obtained by raising the temperature of the filaments enormously; and one cannot have the lighting power augmented in this way per unit of energy consumption without accelerating the wear and tear on the lamps. We are glad to see the inspectors are taking into consideration the questions of glare and eye-strain. This is no doubt due to the persistent work of the Illuminating Engineering Society; but the inspectors might well take into account the physical cause of glare. If they did this, they would soon arrive at the simple fact that the larger the source of light and the lower the temperature of the light-giving medium for a given illuminating power, the lower the intrinsic brilliancy. And the mantle of an incandescent burner as a source of light has a considerably larger area than the filaments of any incandescent electric lamp for a given lighting power. Eye-protecting media cost money. These are points that should not be overlooked by the inspectors. We are pleased to see that the better adjustment of light to work is also receiving attention.

Electrically Heated Steam or Water Radiators.

The inspectors still show strong enmity to flueless gas radiators. In large airy places where the ventilation is as it should be, no solid objection can be advanced against them; but for the comfort of the occupants in smaller places, a flue-connected radiator is preferable. It is stated in the report that electric steam radiators, in which water is vaporized by means of electric current, have come along as a substitute, and that these "appear"

to be in every way suitable for workrooms. It is also said that they can be run at a cost of 2d. per hour, or rather it is "understood" they can be. Electric steam and water radiators are being pushed; but what is their heating efficiency, and are they as economical as a gas or coke heated system of pipes and radiators for factories? The inspectors should inquire into these matters. The electrical rule in heating is that about 1½ watts of electricity are required hourly per cubic foot of room capacity. But workrooms are usually draughty places, and not so easily heated as a well-protected room in a dwelling-house. According to workroom and outside atmospheric conditions, the requisite wattage may run up to 2½ per hour per cubic foot of capacity; and in a workroom of only 2000 c.ft. capacity, this would mean 5 KW. per hour, which at 2d. per unit would demand 10d. an hour, and not 2d. This is allowing 100 p.ct. efficiency; but one cannot transfer the heat energy of electricity to water and produce steam without incurring heat losses. Furthermore, a unit of electricity has only a potential heating value of 3420 B.Th.U.; and this heat cannot without some loss be conveyed to a room with water as the vehicle. We ask the inspectors to consider what size workroom or workshop the twopenny unit of electricity would keep heated under the worst atmospheric conditions, which are the ones that have to be provided for. Perhaps they will also find time to consider a couple of paragraphs, bearing on this subject of electric radiators in relation to theatre heating, which appeared in the "Memoranda" for Feb. 3.

Electrical Casualties in Factories.

There were 390 electrical accidents in factories in 1919; 28 were fatal. The total casualties were less than in 1913 and 1914; but fatalities increased from 20 to 28. It is true there has been an enormous increase of electricity in factories since the pre-war days; but it must be remembered that the inspectors are vigilant, and that this record only applies to factories and workshops. We have recently been talking of the advancing use of alternating current, and the attendant dangers—shock from alternating current being vastly more dangerous than from direct current. Most of the fatalities last year were due to alternating current; and 20 out of the 28 were at low pressure—not exceeding about 250 volts. With two or three doubtful exceptions, the shock was in all cases from one phase to earth. As most of the systems had the neutral point earthed, the shock could not have exceeded low pressure. In seven cases, the shock was received from lighting circuits connected between phase and neutral. The greatly augmented danger from shock from alternating current is a matter that Mr. G. S. Ram, the Electrical Inspector of Factories, says needs to be borne in mind at the present time when there is so much talk about cheaper methods of wiring. The process of cheapening, he says, often begins by eliminating safeguards. Whether for factory or other premises, where alternating current is used, the cheapening process should not be allowed to introduce any unnecessary risk of shock.

Unproductiveness of Artizan House Lighting.

We see in the Ealing housing scheme all the rooms are fitted for electric light, but a gas-cooker and gas-heated water-circulator are being fitted. In many schemes where the local authority are the electricity suppliers, current is being supplied for lighting; but even there gas is having a good adoption for cooking, heating, and hot-water supply. Artizans will not approve of having to pay an electricity and a gas bill; they prefer one inclusive payment. There is no question that many of these electric lighting schemes for the houses of artizans are the result of prejudice or of a reluctance to acknowledge that electricity undertakings cannot supply small consumers without loss. When the costs of capital, maintenance, renewal, generation, and all the other items of expenditure associated with the business are taken into account, together with the character of the consumption, it is positively certain that the lighting of artizans' premises by electricity cannot be a paying piece of trading. The point recalls the frank report that Mr. S. E. Fedden, the General Manager of the Sheffield Corporation Electricity Department, made, and to which we referred in the "JOURNAL" for July 23, 1918 [p. 155]. Mr. Fedden preferred to do without business that would only have meant putting a loss upon the electricity undertaking, which would have had to be made good from some other part of the business. There has been a great deal said lately about consumers who are unprofitable to an electricity undertaking; and it is an insane thing not to recognize the existence of some limit. At a recent meeting of the Bristol City Council, there was confirmation of Mr. Fedden's experience. It was then stated that "efforts had been made from time to time [at Bristol] to put electric lighting into artizans' dwellings; but up to the present they had not been able to produce it cheaply enough, and it was not a business proposition." At Hull, it has been decided that, in view of the small revenue per house, it would be uneconomical to lay an ordinary service main to, and to instal meters in, the new municipal houses. The Electrical Engineer is therefore proposing to run overhead mains, and to charge on a contract rate. The charges suggested are 2s. 6d. and 2s. per week for the winter and summer quarters respectively for parlour-type houses, and 2s. 3d. and 1s. 9d. per week for non-parlour houses. It is estimated that, until the whole of the houses are built, there will be a slight loss on the scheme. If this is so, when the whole of the houses are built, there will no doubt be a greater loss. Why do business at all at a non-paying price? It is unfair to the other consumers; and maybe the ratepayers too will find reason to characterize it similarly.

Ironmongers and Electrical Business.

The "Ironmonger" advocates that the ironmonger should add electrical contracting to his business; and his counter should be well supplied with electrical accessories. "All the facts and information are available; and a lucrative market [our contemporary believes] awaits the energetic ironmonger and hardware dealer who will break-away from the old avenues of thought." The electricity business is, we are afraid, too specialized to make of it, with success, a sort of side-issue to the ironmongery business.

A MANUAL ON GAS-FITTING.

FOR some years past the need for an up-to-date manual on gas-fitting has been apparent to both teachers and students of the subject. The importance of the gas-fitter receiving instruction in the principles of his trade, and in the various forms of gas-consuming appliances, is gradually being realized by gas undertakings; and the continual introduction of new types of gas apparatus calls for a text-book to which a gas-fitter can refer for guidance in the course of his work. The "Manual on Gas-Fitting and Appliances," by Frank W. Briggs and John H. Henwood,* undoubtedly fills a long-felt demand for such a book. The authors have condensed into a handy text-book of 174 pages their practical experience of 25 years in the trade.

The book is intended to form a groundwork on which the gas-fitter may build his further studies, and as such may be recommended. Its value, however, would have been greatly enhanced if more sectional sketches of appliances had been published, in place of the block illustrations of the apparatus. All gas-fitters are familiar, for instance, with the outward appearance of a dry gas-meter and gas steam-radiator; but many of them are ignorant of the internal construction of such apparatus.

It is apparent, from the replies given by gas-fitters at examinations, that many of them have a very poor idea of the internal mechanism of the appliances they are called upon to fix and maintain. Simple diagrammatic line sketches, showing the construction of representative fittings—such as gas-fire adjusters, thermostats, and automatic valves on radiators—would have been welcomed by the gas-fitter reader of the book; and the authors would do well to bear this in mind in future editions of their work. In a manual intended for practical fitters, too much emphasis cannot be laid on the necessity for a simple but accurate definition of terms, and of drawings to illustrate the authors' remarks.

In their efforts to compress the subject-matter, "to keep the book within manageable proportions," the authors have in some chapters sacrificed many valuable practical hints which might with advantage to the student of the subject have been included. On the other hand, some designs (such as those of the incandescent arc lamps shown on p. 68) might have been omitted in a modern manual, as most of them are obsolete.

To compress even the salient features of modern gas appliances and the principles underlying the gas-fitters' work into a volume of 174 pages is a difficult undertaking; and the authors may be congratulated on the success of their efforts. Unlike many text-books for practical students, it is printed in clear bold type; and the seventeen chapters are conveniently subdivided and indexed. It should have a place in the home of every gas-fitter, and will be found to be a handy and useful text-book for students and teachers of the subject.

* "Gas-Fitting and Appliances," by Frank W. Briggs and John H. Henwood. London: Crosby Lockwood & Son; 1920. [Price, 6s. net.]

Forthcoming Southern Association Meeting.—The annual meeting of the Southern Association of Gas Engineers and Managers is to be held at the Hotel Cecil, Strand, W.C., on Tuesday, Nov. 23, at 2 p.m. After the meeting, the members will take tea together.

Future of Producer Gas.—Lecturing at a meeting of the Sheffield Society of Metallurgists and Metallurgical Chemists, Mr. J. Imrie said that the outbreak of war, and the consequent disturbance in relative values of coal and ammonia, had created a condition of things where it was possible that producer gas, such as that obtained from an ammonia recovery plant, would now spring-up to replace expensive town plants. It was possible that it would lead to the setting-up of a number of small producer plants. While the efficiency might be about 25 p.ct. less, the price per 1000 B.Th.U. would be about 50 p.ct. less than town gas. The future of sulphate of ammonia, he said, did not look very bright, owing to the high cost of coal. Nevertheless, a gas plant working on a recovery process had an advantage, as the gas could be transported long distances without loss. An expensive sulphate of ammonia plant was not necessary, as the ammonia was sold direct to the sulphate of ammonia manufacturers.

TEMPORARY TESTING PROVISIONS FOR SOUTH LONDON.

THE METROPOLITAN GAS REFEREES' PRESCRIPTIONS.

Notification for the Last Quarter of 1920.

Office of the Metropolitan Gas Referees,
66, Victoria Street, London, S.W. 1,
Oct. 18, 1920.

WHEREAS the SOUTH METROPOLITAN GAS COMPANY have declared that the calorific value of the gas to be supplied by the Company as from Michaelmas quarter day, 1920, is 550 B.Th.U., and whereas in virtue of this declaration the Company are thereafter required to supply gas in accordance with the provisions of the South Metropolitan Gas Act, 1920,

And whereas the undersigned have been appointed Gas Referees under the South Metropolitan Gas Light and Coke Company's Act, 1876, and other Acts of Parliament, and whereas it is the duty of the said Gas Referees under the South Metropolitan Gas Act, 1920, and other Acts, to prescribe and certify the situation and number of the testing-places, and the apparatus and the mode to be adopted for ascertaining and recording the calorific value, purity, and pressure of the gas to be supplied by the South Metropolitan Gas Company,

Now, therefore, in compliance with the provisions of the said Acts and of the Gas Regulation Act, 1920 [*vide* South Metropolitan Gas Act, 1920, section 16], the said Gas Referees do hereby prescribe and certify as follows—that is to say,

As to the

TESTING-PLACES.

The testing-places shall, for the present, be those prescribed in the Notification of the Gas Referees for the year 1918.

As to the

SERVICE-PIPES TO THE TESTING-PLACES,
MEASUREMENT OF GAS,
and
TIMES AND MODE OF TESTING FOR SULPHURETTED HYDROGEN.

The existing provisions [*vide* Notification of the Gas Referees for the year 1918] shall remain in force.

As to the

TESTING FOR ILLUMINATING POWER.

By section 15 of the South Metropolitan Gas Act, 1920, the declared calorific value of the gas is substituted for the prescribed illuminating power. Testings for illuminating power with the standard argand burner shall, therefore, no longer be made.

As to

SULPHUR COMPOUNDS OTHER THAN SULPHURETTED HYDROGEN.

The mode of testing the gas in order to ascertain the average proportion of carbon bisulphide vapour in it will be prescribed as soon as this testing is required for the purposes of section 21 of the South Metropolitan Gas Act, 1920.

Testings for sulphur compounds under the London Gas Act, 1905, section 5 (5), may be made as hitherto prescribed on such days as the Controlling Authority directs.

As to the

TESTING FOR INERT CONSTITUENTS.

The description of the apparatus required, and the mode of testing the gas supplied for ascertaining the percentage of inert constituents, will be given in a Supplementary Notification.

As to the

MODE OF TESTING THE PRESSURE AT WHICH GAS IS SUPPLIED.

The mode of testing the pressure at which gas is supplied shall for the present be that prescribed in the Notification of the Gas Referees for the year 1918.

As to

TESTING THE CALORIFIC VALUE OF THE GAS.

The Gas Referees are not prepared at present to prescribe a recording calorimeter for continuously measuring and recording the calorific value of the gas supplied. They are prepared to sanction the installation and trial in one or more of the testing-places of a recording calorimeter of any type which they, or the Gas Company, or the Controlling Authority, may think will satisfy the requirements of official use, and have already taken steps in this direction. Observation of the working of such trial installations will serve to guide them in prescribing recording calorimeters for official use at a later date.

For the present, the Gas Referees hereby prescribe that the calorimeter described in their Notification for 1918, with which the testing-places for the South Metropolitan Gas Company are already provided, shall be used in making testings of calorific value, and the average of the calorific values ascertained by all the testings of the gas made on any one day at any testing-place shall be deemed to be the calorific value of the gas supplied by the Company on that day at that testing-place [South Metropolitan Gas Act, 1920, section 14].

The Gas Examiner at each testing-place shall make daily (Sundays included) three testings of the calorific value of the gas; the interval between two consecutive testings being not less than three hours. The testings shall be made according to the instructions given as to the mode of testing the calorific power of the gas in the Notification of the Gas Referees for the year 1918. The measurement of the amount of condensed water resulting from the combustion of the gas need not be made more than once a day. The calorimeter must be fitted with a device by which the gas is automatically shut off in the event of interruption of the water supply to it. Until this device has been provided, gas must not be left burning in the calorimeter between two testings, if the Gas Examiner is absent from the testing-place for more than one hour.

If the calorific value of the gas, ascertained in any one of the three testings for the day, is more than 5 p.ct. below the declared calorific value, the Gas Examiner shall make a second (supplementary) testing after an interval of not less than one hour; and the mean of the two testings shall be deemed the calorific value of the gas supplied by the Company at that testing-place for a period of two hours [Gas Regulation Act, 1920, section 9 (1)].

REPORTS.

The results of the testings made by each Gas Examiner shall be reported by him to the Controlling Authority, to the Gas Company, and to the Gas Referees, as follows:

The Gas Examiner at each testing-place shall make, within 24 hours, a report in the form of which an example is appended of the results of the testings made by him each day (midnight to midnight). He shall include in such report the sum of the results of the daily testings of calorific value of the gas supplied to the testing-place from the first day of the quarter—*i.e.*, the three months commencing on the first day of October—to the immediately preceding day, and shall add to it the calorific value of the gas supplied as ascertained by the testings for the day. He shall divide the figure so found by the number of days in the quarter on which testings of calorific power have been made, in order to show the average calorific value of the gas supplied from the first day of the quarter to date. The average calorific value, thus ascertained, in his report for the last day (Dec. 31) of the quarter, will be the average calorific value of the gas supplied by the Company in the quarter to that testing-place.

For the purpose of ascertaining the average calorific value of the gas supplied by the Company in the current quarter, the Gas Examiner shall accept, as the calorific value for the day for dates from the 1st October to the day of issue of this Notification, the results of testings of calorific power which have been made during that period, by direction of the Controlling Authority, according to the provisions of the London Gas Act, 1905, section 5.

The means by which the results of the tests shall be made available to the public will be prescribed later.

These regulations shall be in force for the South Metropolitan Gas Company until superseded by a subsequent Notification.

C. V. BOYS,
W. J. A. BUTTERFIELD,
J. S. HALDANE,
} Metropolitan Gas Referees.

[APPENDIX.]

EXAMPLE OF FORM OF GAS EXAMINER'S REPORT.

COUNTY OF LONDON GAS-TESTING PLACE.

104, *Hill Street, Peckham, S.E.* 15.

REPORT OF GAS SUPPLIED BY THE SOUTH METROPOLITAN GAS COMPANY.

FOURTH QUARTER OF THE YEAR 1920.

Date and day of week	Tuesday, Nov. 9, 1920.
Day of quarter	40
Number of days in the quarter on which the calorific value of the gas has not (for any reason) been ascertained, or the testing of calorific value has been cancelled	1

Calorific Value. British Thermal Units (Gross) per Cubic Foot.			Sulphuretted Hydrogen. Absent.
Testing.	Time.	B.Th.U.	Pressure in tenths of an inch of water.
(1)	8.45 a.m.	555·6	
(2)	2.30 p.m.	559·4	Street.
(3)	5.30 p.m.	551·8	Time.
(4)	—	—	Pressure.
		3) 1666·8	Sulphur in 100 cubic feet of gas, in grains. 22·7
Calorific value for the day		555·6	
Sum of previous daily results		21202·1	
Sum of daily results, to date		39) 21757·7	
Average calorific value, to date.		557·9	Illuminating power, flat-flame. Time, candles (corrected).

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GAS EXAMINER.

THE OPPORTUNITIES AND OBLIGATIONS OF A GREAT PUBLIC SERVICE.

By F. W. Goodenough, the Chairman of the Executive of the British Commercial Gas Association.

[A Paper read at the Sheffield Conference, Oct. 19.]

This is the first visit of the Association to the City of Sheffield; and, therefore, although it is doubtless familiar to many of the citizens through its publicity campaigns, and its work has of late become better known than formerly to the Chairman and Directors of the Sheffield Gas Company—who, I am afraid, in former days had it commended to them with something of that faint praise that is often worse than damnation—the Executive felt that a brief exposition of its policy and of the ideals at which it is aiming would not be out of place at this conference.

In attempting that task on their behalf, I have taken as the title of my paper, "The Opportunities and Obligations of a Great Public Service," in order to emphasize four points:

1. That service to the public is the primary object for which the gas industry exists, whether the undertakings be run by private or municipal enterprise.
2. That the right of exclusive service in its defined area imposes upon each undertaking obligations far beyond that of simply supplying gas to each person owning or occupying premises within that area and within the statutory distance from the nearest main, who may make application for such a supply, and conform with the necessary formalities.
3. That in the profitable conduct of its business every gas undertaking has opportunities for being of service to its consumers, not merely as such, but also to them as a community and to the nation as a whole of which they form a part.
4. That the Association can be of very real assistance to each undertaking in making the best use of its opportunities, in fulfilling its obligations, and in perfecting its direct service to the public.

That is what we mean when we state that the aims and policy of the "B.C.G.A." are "seeking by co-operative action to benefit the gas industry in particular by increasing its power to serve beneficially the nation in general."

By Co-Operative Action.

Let me emphasize these words. The Association is nothing external to the industry. Money contributed to it is spent by the industry for the industry. The Association is of the industry; and it can only serve the industry in so far as it receives the whole-hearted support and co-operation of the units in the industry, and is used fully by each unit.

We in charge of the organization draw not merely our funds but our vitality from you, the individual members; for an organism can only live and grow by exercise and by use. "All for one, and one for all," is our motto; and each half of the motto is as important as the other. We want that to be clearly realized by everyone, so that we may combine the knowledge, experience, ideas, and enthusiasm of all, and be called upon for, and be stimulated to fullest service by, all. Thus, and only thus, can the Association be a living organization growing always in power to serve its component members. And only by co-operation can the industry, numerous in its units, achieve its utmost possibilities of service and success. An industry which comprises over 1600 undertakings has every reason to endorse, as during the war it has proved and found true, the maxim "Union is strength." And those who hesitate to co-operate in organizations whose policy is directed by those representing more than four-fifths of the output of the country, because they do not exactly agree with this or that item of those policies, or because they believe they can advance more surely on their own special path, may not unjustly be asked how they think this crowded, highly-organized, and complicated world of ours could progress if everyone took that highly individualistic line.

In the troublous and difficult times in which we find ourselves to-day, and which lie before us in the future, co-operation—that "acid test of sanity" as it has been called—will be more than ever necessary to the maintenance and advancement of the industry.

Now what are the opportunities of service to the nation which the Association can help each undertaking to grasp, and what are the obligations it can assist each undertaking to fulfil, in its capacity as a branch of public service?

One of the first of our opportunities as an industry, I suggest, is clearly and constantly to demonstrate that public service is not inconsistent with sound business principles, with economy, and with efficiency in the fullest meaning of the word. The public of recent years have had such a sickening of public dis-service at the hands of government departments (often referred to as the "un-civil service") that it is to-day more than ever imperative that we should get right away from the idea that did so much in the past to check the full development of the gas industry, and is still doing all too much to hinder it—the idea that, because we are a public utility service with a monopoly of supply in our respective districts, we have no need to adopt (that it is undignified to adopt) commercial methods in dealing with the public; and that it is more dignified to sit at ease in our bureaucratic chairs and act as if we were conferring a favour upon the public in allowing them, on terms, to have a more or less adequate supply of gas.

Do you think I am being sarcastic without warrant when I speak of a "more or less" adequate supply? You would not, if you had had to discuss the question of the proposed minimum pressure to be required by Statute with representatives of the railway companies, who take their supplies from gas-works all over the country! It was nothing less than astounding and humiliating to some of us to learn of the views taken by some gas undertakings of their obligations to the public. Anyone would really have thought that their one aim in business was to keep down the output of gas, as they certainly succeed in doing, not merely by the poor pressure given, but by the certain consequence of their policy that no one in their districts uses gas unless compelled by necessity to do so.

If we of the gas industry are to play the part in the national economy that we could and ought to play, we must everyone of us consign to the lumber room of the past all those ideas, never sound, but never as now so foolish and prejudicial, as to what public service implies. It has been well said that we make our money out of our friends; for our enemies never willingly deal with us.

Well, we can only make friends of our consumers—and, as many of you can testify, you can make very good friends of your consumers—by giving them good service, in every sense of the term. By supplying gas of consistent and adequate quality and pressure; by ensuring that we have suitable and economical gas consuming appliances, properly fixed and efficiently maintained; by treating every complaint made as having for its origin either fault on your part or misunderstanding on that of the consumer; by taking as your motto, and ensuring that your staff takes it as theirs, the fact that—

> "The consumer pays wages, salaries and dividends.
> The satisfied consumer is the best advertisement.
> It is our business to satisfy the consumer always."

By always, as managers, studying and trying to meet the consumers' point of view, remembering that you cannot expect them to understand your business, so that it is for you to explain it to them; by teaching consumers how to make the best use of the gas they buy, and how they can with advantage make use of more. By these means, and by training your staff in technical skill as well as commercial principles from the bottom to the top, and organizing and directing their work on efficient and economical lines, you will make friends of the public, because you will have served the public well, you will bring down the price of gas, and you will create ever-increasing business and profit for your undertaking.

That is our first and great opportunity—to prove that a public service can be so conducted as to be of the fullest use to the public and of greatest profit to those who serve.

Here may I say, Do not let any of us think that it is only "the other fellow" who has to prove this; that we in our own undertakings are all right; that our policy is perfectly sound; that we and our men and our methods are the most efficient possible. Self-criticism is always much more profitable than self-satisfaction; and personally I am far from satisfied with the standard of service to the public that we have reached. And I hope I always shall be. Unless we constantly progress, we go back. We must never forget the moral of "Milestones." So let us each look not out of the window but in the mirror for those who need to examine critically their policy and their methods.

In striving to perfect our service to our consumers we of the gas industry are in the happy position of knowing that when we serve the public to the best of our ability in their individual capacity, we in so doing also serve well our country as a whole.

In the course of this conference we shall hear in what ways the gas industry can assist in conserving our precious and diminishing coal supplies; in increasing the fertility of our land; in developing our chemical industries and the industries dependent on chemicals for their raw materials; in reducing the cost of production in our factories; in reducing the cost of house building; in making our homes (both existing and—some day!—to come) less of a drudgery for the woman and more of a home for the man; and in raising the standard of vitality and lowering the death-rate in our towns and cities.

These are services to the nation which any industry may be proud to render; and the consciousness that they can assist in doing such service must increase the happiness of all engaged in the industry, as it does that of those directing the activities of an Association which has those possibilities always before it in planning its campaigns.

If, then, every gas undertaking has, in its measure, these opportunities of service, alike to the individual, to the community, and to the nation, the obligations which rest on every such undertaking are surely self-evident. As each undertaking has a monopoly of supply in its area, so it has a monopoly of opportunity for service; and consequently it has an imperative obligation placed upon it to use the opportunity to the full extent of its power. Otherwise it fails in its trust, fails in its public duty.

But if our coal is as far as possible to be used economically, productively, and without injury to the public health; if our industries are to be developed as fully as they may be; if production is to be increased and cheapened to the utmost; if our homes are to be built at less cost and to be rendered as home-like as possible; if, in short, the nation is to be benefited to the extent it

could and should be by the extended use of gas for fuel and power—how can so desirable an end be attained unless, both by its own local efforts and by co-operation with every other undertaking along lines on which no one undertaking however large can afford to work alone, every undertaking does everything possible to bring constantly to the knowledge of every single consumer, actual or potential, domestic or industrial, and to the knowledge of everyone who educates or advises the public, and of everyone engaged in the administration of public affairs, whether local or national, the advantages and possibilities of the use of gas and of gas coke, at once for the individual and for the nation?

No single man or woman in the industry knows at this minute all the many ways in which gas can be advantageously employed. How much more then is it true that no consumer knows all, and that few know half, or one-quarter, there is to know about the subject?

Further: How many of the public understand the policy of the gas industry—the laws that govern its operations; the equity of the sliding-scale principle; the truth about gas-meters; the facts about coal conservation, or about the smoke curse, and what gas can do to mitigate it? How can they know if you do not tell them? It is your duty to tell them, to tell them again and again, until they really know the facts; to use the power of publicity, the magic power of suggestion, until they are as familiar with the truth about gas from their youth upward as they are with the law of gravitation.

And you can only do this thoroughly by a combination of local effort (in which, as you will hear in more detail to-morrow, the Association can be of very considerable service to you), and of co-operative effort on district and national lines provided by joint finance and joint administration, in which every undertaking takes its share according to its magnitude. That is one of the services the Association exists to provide, and is providing to the best of its power within the limits of its means.

Further: If all the possibilities for the nation and for the industry are to be realized to the full, we have to organize and perfect not only the needful publicity, but the not less necessary good service, without which we cannot reap the harvest our publicity has sown, watered, and tended. Through our publications, our conferences, and our discussions, aided well as we always are by the technical journals of the industry, something we hope has been done already towards this end, mainly so far in arousing a consciousness of the need for improved standards of service. We have made a beginning also with a service which will help managers the better to plan, and the more economically to carry out, the work both of getting and executing orders, and also the routine work of the public service side of the industry.

But there remains a greater task—that of organizing a broad and thorough scheme of education for those engaged on the supply and utilization, as distinguished from the manufacturing, side of the industry. The problem of creating educational machinery which will succeed in producing men with the many qualifications (of personality as well as knowledge) essential in a first-class commercial-technical representative of a gas undertaking, and in providing the necessary training for the other members of the commercial staff, is far from being a simple one. But its urgency is recognized, the question is receiving very careful consideration, and it is hoped that before long the Association will be able to offer service to the industry in this direction also.

The Institution of Gas Engineers is at present engaged on a scheme for the better education of the technical staff of the industry; and, with the requirements and opportunities of the Fisher Act before us, in respect of the rank and file, it is evident that a co-ordination of all our educational plans by the National Gas Council will be a necessity of the near future.

There is one more point I want to emphasize—one that will appeal to all who have an eye especially to economy just now; and then I will make no further claim on your attention, though I am always tempted to let myself go when I begin to talk about the possibilities of co-operative work for the industry. The point is this. By the use of adequate, persistent, well-conceived, and well-executed publicity—publicity on the broadest educative plan (not merely "advertising" in the narrow sense, though that too plays an important part), by means of publicity on co-ordinated local and national lines, backed-up by courteous efficient service given by a thoroughly trained staff directed on a just and wise policy—you can secure the maximum possible development of your undertaking at the least possible cost.

Good publicity, *plus* good service, will sell considerably more gas per consumer and per mile of main through apparatus bought or hired by the consumer on terms remunerative to the undertaking, installed and maintained at the user's cost, and will reduce the price of gas to everyone to a lower figure, than will free apparatus, free fixing, and free maintenance, given away with indifferent, inefficient service to consumers left in ignorance, so far as enlightenment by the gas supplier is concerned, of what gas could and should do for them individually and collectively. Publicity, backed by service, gets the highest results in output, reduces cost to the buyer, and increases profit to the seller. Money spent upon it is a rapidly productive investment.

In concluding this brief and inadequate outline of the work the Association is doing and hopes to do, let me say that we of the Executive believe that the possibilities of development in the gas industry in the near future—after we have got through the period of depression and re-adjustment which immediately threatens—are nothing less than immense. We believe that every gas undertaking has before it great opportunities for service to the public. We believe that every undertaking needs the co-operation of every other to enable it to fulfil the obligation which lies upon it to make the fullest use of those opportunities, and to achieve the abundant measure of success that is the certain reward of worthy service well done. On these grounds, and because we believe that with your help the Association can provide the machinery for such co-operation, we ask for it your whole-hearted support.

THE GENERAL COMMITTEE'S REPORT.

The following is the ninth annual report of the General Committee, which with the statement of accounts, is being submitted at this week's conference.

INCOME.

The income for the year [ended Aug. 31] was £2050 in excess of that for the previous twelve months, after the retention by the Institution of Gas Engineers of nearly £500 more on research work account than in 1918-19. The sum so retained (£2247) has without question been spent to great advantage for the industry; but it could ill be spared from the income of the Association. This is made very clear when the expenditure account is examined.

EXPENDITURE.

To meet the steadily increasing costs of administration and of rendering service to subscribing undertakings (especially in connection with the housing question); to carry on the District Conference campaigns, at which that question and the subject of smoke abatement were brought prominently before the public; and, with the greatly increased cost of space, to provide funds for a diminished and altogether inadequate advertising campaign mainly devoted to the housing problem—the total income and all the reserves of the Association (amounting to £3146), have been expended, leaving a deficit of £404 to be met out of the income for the coming year.

The cash shortage due to this policy (which the urgent need for dealing with the housing problem as boldly as possible rendered necessary), to the absence of any "floating capital," and the largely increased sum locked-up in stocks of printed matter, has been temporarily met by the payment in advance of subscriptions for the year 1920-1 by a large number of undertakings. Obviously, if the publicity work of the Association is to be carried on in the coming year on even the modest scale of pre-war times, and its other services to the industry are to be continued, an early substantial increase in income is imperative. This important and urgent question is receiving the joint consideration of representatives of the National Gas Council, the Institution of Gas Engineers, and this Association.

It is gratifying to note that the number of subscribing undertakings has increased during the year by 24, bringing the total up to 633, representing over 85 p.ct. of the industry as measured by output.

PUBLICITY WORK.

Publicity during the year has been, as already indicated, largely centred upon the housing and smoke abatement questions. The amount of interest that has been aroused throughout the technical professions, among local authorities and the public generally, points to the soundness of that policy. The literature bearing on these questions published by the Association for circulation by subscribing undertakings has been extensively utilized. Close touch has been regularly maintained with the Ministry of Health; and the case for gas from all points has been kept well before the authorities.

The Minister of Health has given sympathetic consideration to the various matters brought to his notice, and has approved and adopted several suggestions calculated to facilitate the equipment of the homes of the future with gas appliances. In this connection, two important points may be specifically mentioned—namely, the Ministry's approval and recommendation of the gas-fire flue, and their adoption and publication in their official organ ("Housing") of the standard instructions for drafting specifications for the gas-piping of houses, which were prepared and issued by the Association. The model houses showing complete gas equipment which were put at the service of subscribers have been in constant use.

The interim report of the Departmental Committee on Smoke Abatement bears testimony to the value of the evidence submitted to that Committee on behalf of the industry. The report has been widely circulated by subscribing undertakings.

The Association's work among the schools has been continued with increasing success. The children's competition secured a record number of entries, and is definitely established as a valuable branch of the Association's educative campaign.

DISTRICT CONFERENCES.

The series of District Conferences which were held at Darlington, Manchester, Leamington, Bath, Leeds, Glasgow, and Norwich served a very useful purpose; and it is proposed to continue the holding of such meetings as a regular part of the work of the Association.

SALES ORGANIZATION DEPARTMENT.

The work of this Department is growing rapidly, as it is found capable of valuable service to those undertakings which have engaged its assistance, both in regard to sales development and the organization of office and district work.

VICE-PRESIDENTS.

There have been added to the list of Vice-Presidents during the year: Mr. H. H. Kendrick, M.R.C.S. (Coventry); Alderman J. H. Lloyd (Birmingham); Mr. John Murphy (Dublin); Mr. Reginald M. Rowe (Ilfracombe); Mr. Alexander Wilson (Glasgow); Mr. Henry Woodall (London); and Alderman R. J. Young (Stafford).

OBITUARY.

The Committee have to record with very deep regret the sudden death of Mr. Thomas Waddom, a Trustee and Vice-President of the

Association, and, until his retirement from active service in Newcastle, an energetic and enthusiastic supporter of the Association.

AMENDMENT OF RULES.

The business of the annual general meeting will include consideration of the following motions:

That Rule 8 be amended to read as follows:

(*a*) The Secretary shall issue within one month of the date of the annual general meeting in each year to every subscribing undertaking in each district a list of the members and the vice-presidents then representing that district on the General Committee, with an intimation as to (1) which of those members are retiring, (2) whether they offer themselves and are nominated by the General Committee for re-election, (3) whether there are any additional nominations by the General Committee, and (4) how many members the district is entitled to elect. With this information, the Secretary shall issue a letter to each undertaking asking whether the undertaking desires to nominate any other member as a candidate for election, and stating that any such nomination must be signed by not less than two members representing the undertaking, and must be sent to the Secretary within seven days of the receipt of his letter.

(*b*) Upon the receipt of such additional nominations (if any) the Secretary shall prepare and send out balloting-lists to each subscribing undertaking in the specified area.

(*c*) If no additional nominations be received within the specified time, the candidates named in the lists issued to the subscribing undertakings shall be deemed to have been duly elected by those undertakings.

(*d*) Upon receipt of such lists, each subscribing undertaking shall indicate (as therein directed) the names of the candidates for whom such subscribing undertaking wishes to vote, and shall return the balloting-lists to the Secretary of the Association so as to reach him by a specified date, being not less than seven days after their issue. The balloting lists shall be opened by two Scrutineers appointed by the General Committee; and the result of the election shall be announced in the next issue of the "Bulletin."

(*e*) Each subscribing undertaking shall be entitled to the same number of votes as is equal to the number of members of the Association which such subscribing undertaking is entitled to nominate under the provisions of Rule 6, and may give such number of votes to such number of candidates as shall equal the number of members to which the area is by scale entitled.

That Rule 9 be amended to read as follows:

(*a*) At the annual general meeting held in the year 1920, the whole, and at each succeeding annual general meeting, one-third of the ordinary members of the General Committee, or the nearest possible number thereto, shall retire, and shall be eligible for re-election.

(*b*) The members so retiring shall be those who have been longest in office; and in case of an equal term of office, the members to retire shall be decided by lot. The members retiring shall remain in office until the election of their successors as hereinbefore provided.

(*c*) The General Committee shall have power to fill-up any vacancy occurring among their members during the interval between the annual elections; and members so appointed shall hold office only during the unexpired period of office for which the retiring or deceased members were elected, after which they shall be eligible for re-election. In exercising this power, the General Committee shall select a member from the specified area which supplied the member creating the vacancy. Should the vacancy be created in the case of a member nominated by any such Society as aforesaid, the vacancy shall be filled on the nomination of such Society.

(*d*) The General Committee shall meet at least once every three calendar months. Its main functions shall be to decide on the general policy of the Association, to receive and consider reports, and to transact any other necessary business. A quorum shall consist of not less than seven members.

(*e*) The General Committee may nominate by resolution from time to time two members of their Committee, or two members of the Executive Committee, to sign on behalf of the Association any documents not relating to the acquisition of real or personal estate to be vested in the names of the Trustees of the Association.

ELECTION OF PRESIDENT FOR 1920 21.

The Committee have the pleasure to report that Mr. D. Milne Watson, M.A., LL.B., has consented to be nominated for election as President for the ensuing year.

ROBERT A. HADFIELD, President.
F. W. GOODENOUGH, Chairman of Executive.

Summer Time to Cease next Monday Morning.—The Home Secretary has intimated that it is not proposed to make any further extension of summer time. Accordingly, summer time will cease, and normal time will be restored, at 3 a.m. (summer time) in the morning of Monday next, Oct. 25, when the clock will be put back to 2 a.m.

Temporary Increase of Charges Act.—The Ministry of Health have made Orders under the Statutory Undertakings (Temporary Increase of Charges) Act authorizing the Clacton Urban District Council to increase the maximum price charged for gas from 6s. to 9s. per 1000 c.ft.; and the Wath, Bolton, and Thurnscoe Gas Board, from 4s. 2d. to 5s. 2d. per 1000 c.ft.

FACTORIES AND WORKSHOPS REPORT.

HOURS of works, and subjects relating to welfare generally, occupy a large portion of the report for the year 1919, of Mr. R. E. Graves, C.B.E., the Chief Inspector of Factories and Workshops, which has lately made its appearance as a Blue-Book. In this connection, it is reported that a Research Board, upon which the Home Office is well represented, has been appointed by the Department of Scientific and Industrial Research and the Medical Research Committee jointly, "to consider and investigate the relation of the hours of labour and of other conditions of employment, including methods of work, to the production of fatigue, having regard both to industrial efficiency and to the preservation of health among the workers." The leaflets issued during the year embraced one containing "Suggestions for Rules for Safety Committees in Factories and Workshops." Under the Factories Act, an Order was made last November requiring the notification of all cases of *epitheliomatous ulceration* due to tar, pitch, bitumen, mineral oil, paraffin, or any compound, product, or residue of any of these substances.

In a chapter on industrial developments and the state of trade, written by the Chief Inspector, he remarks that, apart from a few scattered examples, too little thought seems to have been given, by those discharging women, to what might be done in the way of adaptation of work for them, or improvisation of training to prevent their unemployment. On the whole, the position is simply that "women have almost disappeared from engineering works." Mr. H. J. Wilson, O.B.E., deals with safety, and says that several inspectors comment on the old evil of cleaning machinery in motion still being a prolific source of accidents; and one draws attention to accidents which are rendered more serious by the absence of arrangements for immediately stopping machinery. Eliminating all accidents which could reasonably be attributed to absence of fencing, there remain a vast number which no known safeguards could obviate. Their prevention lies rather in the training and education of the worker. To assist in propaganda work, and to enlighten manufacturers and workpeople as to the ever-present danger of shafting and mill gearing, a pamphlet on "Fencing and Safety Precautions for Transmission Machinery in Factories" has been prepared by the Home Office, and is being widely distributed.

Mr. Goddard (Norwich) mentions a new application of the use of a small gas-heated steam-boiler, which is being met with in several of the boot and shoe factories. It is attached to the turn-shoe sewing machine, and is in substitution of gas heating at the stitching-point—gas being the method of heating in the old type of machine. One advantage obtained by this system, he says, is that the fumes from the naked gas-jet are abolished; but the boiler itself is heated by a bunsen burner, the waste gases from which are carried off by a flue-pipe, and discharged outside the work-room. These boilers, though small, come within the scope of the Act, and require to be periodically examined. Mr. Goddard adds that this system of heating will be applied to other similar machines in boot factories.

There are some remarks upon the precautions necessary in refractory materials works; and it is stated that a good deal of propaganda work is necessary among the silica brick workers to make them realize the danger of injury to health. But the medical examinations now being made under the Workmen's Compensation (Silicosis) Act should help to enlighten them.

As to tar distilling, several gassing accidents have occurred in tar-stills in the North-Eastern Division; and Mr. C. F. Wright (Superintending Inspector) is far from satisfied with the observance of the voluntary regulations, or with the rescue and first-aid appliances provided. In one case, two men entered a still contrary to instructions, and without the pipe-connections having been blanked-off, or the residual gases cleared by steam. One man was fatally gassed by sulphuretted hydrogen coming back from an adjoining still; and several other workmen were gassed in attempts to rescue the deceased. Mr. Wright's comment is that, had a waist-belt and life-line been used in this case, as provided for by the regulations, the fatality would probably have been prevented.

There is a chapter on the use of electricity in factories, by Mr. G. S. Ram, in which the writer says he found, as usual, many examples of bad and dangerous work. Even where good apparatus is supplied, dangers are often introduced through ignorance. Particulars are given of 28 fatal accidents in 1919.

The section devoted to sanitation is by Mr. C. F. Wright, O.B.E., and Miss Slocock, who remark that, though reference is made in some reports to numerous cases of low temperature, said to be due to general shortage of fuel and the necessity for economy in the use of both coal and gas, it is very satisfactory that the whole question of heating—especially in large factories such as engineering shops—appears to be receiving much attention; and information as to the installation in these works of the unit system of heating is made in reports from nearly every division.

It seems that during the war there was some increase in the use of flueless stoves. The reporters' comment is: "There is much to be said against this form of heating; and it is at least questionable whether it conforms to the requirements of the Act. It is not necessary to prejudge this matter here; but it is generally admitted, even by the makers of the stoves, that they are only suitable where there is full and adequate means of ventila-

tion. This is a point which the staff have been instructed to watch very closely. . . As a substitute for flueless gas-stoves, Mr. M'Nair (Inverness) refers to a new electric steam-radiator, in which water is vaporized by means of the electric current, and which appears to be in every way suitable for work-rooms. These radiators can, he understands, be run at a cost of 2d. an hour."

LIGHTING.

Progress is generally recorded in lighting both by electricity and gas. Diffused ceiling lighting appears to be coming more and more into vogue, and has certainly great advantage over some other systems of illumination, since, if the lamps are properly placed, there is an absence of both glare and shadow. The arc lamp is disappearing, and the "half watt" lamp is taking its place. This lamp is described as the last word in efficiency, as it gives a brilliant light for small energy consumption. One objection to electric lamps of this type, however, is the glare; but this can be overcome by using proper shading—the indirect method of reflection being often adopted. The general question of shading both electric and incandescent gas lights has received the attention of the staff; and the better adjustment of light to the work is also frequently noted. Mr. Eraut (Belfast) comments on the improved illumination in linen weaving sheds and in handkerchief hemming and embroidery work:

> The concentration of light on the cloth being woven is effected by means of carefully shaded electric lamps, whereby the worker is protected from the glare, the reed space is thoroughly illuminated, and at the same time sufficient lighting is provided for the gangways. In fine stitching it is obvious that a very efficient system of lighting is essential, if the eyes of the workers are not to be strained; and this is being secured by means of lamp shades with a very acute cone angle, which concentrates the light on the work immediately under the machine needle, and leaves the worker's face shaded.

Similarly the high degree of accuracy necessary in the work in many of the factories in Coventry and Rugby makes good lighting imperative. There most of the factories are lighted by means of electric lamps, which are either of the arc type, and fixed considerably higher than the workers' heads, or of the metal filament type attached to flexible cables, and taken to the machines which are in use—the workers' eyes being protected from glare by the use of adjustable coloured shades of metal or glass, frosted glass, or globes of the "Holophane" type. The introduction of a concentrated form of lighting is reported also in the Norwich boot factories, more particularly at the machine tables, where it is now frequently found that the lamps are carried on standards affixed to the tables, and so constructed that the light can be fully directed on the work and shaded to protect the operator's eyes from the glare. These lights are highly spoken of by the workers, who appreciate the absence of eye strain.

As an instance of bad lighting, Miss Sanderson refers to a clothing factory in which all the electric bulbs were hung about 5 ft. 6 in. above the floor level. At the time of her visit, the firm had just bought a new lot of shades, in the hope that they would relieve the eye strain. But when she pointed out that even with these shades the greater portion of the electric bulb would still project below the shade, the firm discarded them and procured others of a deeper shade. Even so, owing to the position of the bulbs, it was found impracticable to shade them all satisfactorily without unduly darkening the room, with the result that the glare remained. She mentions the case as pointing to the necessity for providing separately for general lighting of individual machines or parts of the work.

ESCAPING GASES.

In the account of accidents caused by the escape of different kinds of gases, it is reported that the starting of suction gas engines accounted for three cases, escape from tubes and flues for three, and repair to tubes and engines also for three. The one fatal case resulted from the operation of charging the producer plant—the wind blowing the gas into the worker's face. As to coal gas, two fitters were fatally gassed (and also a fire brigade officer and a fireman who went to their rescue) when removing a hand-hole cover preparatory to fixing a new one.

In a case of gassing while engaged in cleaning a tank which had contained ammoniacal liquor and toluene, the report stated that a Siebe Gorman's gasman's respirator (which enables a man when engaged on such operations to breathe the outside air) was ordinarily used; but on the occasion in question the man neglected to wear it. In other somewhat similar cases which have occurred recently owing to insufficient precautions in the cleaning of tanks, the following instructions have been given:

(1) The period of "airing" should be six days.
(2) That to clean-out the mud in the tanks, they should be filled with water, and steam blown through the water until it boils. It is important that the steam-pipes should go to the bottom of the tank, and that means should be adopted, by stirring or otherwise, to ensure a thorough emulsion of the mud.
(3) If a tank has been standing for any length of time, it should be filled-up with water, and then emptied immediately before anyone enters it.
(4) No one should be allowed to enter or work in a tank unless wearing a face-piece or helmet with india-rubber piping attached, and communicating with the outside air (such as a Denayrouze or Siebe Gorman apparatus), or a self-contained breathing apparatus by means of which a person using it in a poisonous atmosphere breathes ordinary air, or air mixed with oxygen.
(5) Anyone entering a tank should wear a life-belt with a line attached; the end being held by a person on the outside of the tank.
(6) A cylinder of oxygen, with proper connections and face-piece, should be kept ready for use.

From many districts, improved canteen arrangements are reported; one inspector including gas-works among the places in which he has found considerable development in this respect. The remarks made show the usefulness of the gas-cooker for the purpose. The Interim Reconstruction Committee for the patent fuel industry have been urged to take into consideration again remedial measures for the elimination of "pitch cancer."

KOPPERS TYPE REGENERATIVE FURNACES.

There is abstracted in the "Technical Review" an article from "L'Industria del Gas" which briefly surveys the results obtained by the use of Koppers type regenerative furnaces.

Summing up, it is stated that the regenerative furnace saves much fuel for heating, and increases efficiency; and while its life is considerably longer than that of other types, it works practically without attention and with the use of almost any kind of fuel. The following table shows the comparative results obtained with the recuperative and regenerative types of producers. In drawing-up the table, there was assumed a plant of ten producers, each comprising nine horizontal retorts, 400 by 600 mm. in cross-section and 4·5 m. long. In both cases the producing period is taken as six hours.

—	Recuperative Furnaces.	Regenerative Furnaces.
Retort charge	320 kg.	400 kg.
Quantity of coal distilled in 24 hours	115 tons	144 tons
Yield of gas per ton of coal treated	300 cb.m.	320 cb.m.
Gas yield from the ten producers in 24 hours	34,500 cb.m.	46,000 cb.m.
Consumption in producer of coke containing 10 p.ct. of ash	20 p.ct.	12 p.ct.
Coke consumption for the ten furnaces in 24 hours	23 tons	18·3 tons

The production of coal tar and sulphate, and labour required, are taken as equal in both cases, though actually the sulphate yield is higher with the regenerative producer, because it is more uniform.

The retorts in the regenerative producer can be charged with a greater quantity of coal, because distillation proceeds more rapidly, owing to the higher temperature, the greater suitability of the refractory material, and greater external cleanliness of the retorts through the absence of deposits of coal dust, &c. The yield of gas is thus increased from 5 to 10 p.ct.

Effects of Daylight Saving in America.

Mr. Preston S. Millar, in a paper read before the Philadelphia Section of the Illuminating Engineering Society, discusses the advantages and disadvantages of daylight saving as experienced in the United States. The author, who is General Manager of the Electrical Testing Laboratories of New York, gives estimates of the savings in coal and in expenditure for light throughout the entire country during the seven summer months under "daylight saving" regulations, as follows: Electricity, annual saving in coal, 300,000 tons; annual saving in expenditure for artificial light, $14,000,000. Gas, 195,000 tons; and $5,250,000. Total, 495,000 tons, and $19,250,000. Considering the question generally, Mr. Millar's views are that the twenty-four hours of the day have been distributed among work, recreation, and sleep as a matter of evolution in which the comfort and convenience of the greatest number of people have been the only *desideratum*. In advancing activities during the summer by one hour, the well-to-do, articulate part of suburban and urban communities is at an advantage, whereas the poor in urban communities suffer. It would seem more important to serve the interests of the latter; and departure from standard time seems therefore inexpedient. Diversification of hours in industry serving the convenience of different classes, seems more desirable than misadjusting the time in order to impose the wishes of one class of the population upon all.

The annual meeting of the Gas Companies' Protection Association is fixed for 3 o'clock on Thursday of next week, Oct. 28, at Caxton Hall, Westminster. The report and accounts will be submitted; and the re-election of Sir J. Fortescue Flannery, Bart., M.P., as President, and Mr. H. E. Jones and Mr. Charles Hunt as Vice-Presidents, will be proposed.

There is to be a congress in the hall of the Royal Society of Arts, under the auspices of the Labour Co-Partnership Association, on Tuesday, Wednesday, and Thursday, Oct. 26, 27, and 28, at which various well-known speakers on the subject will express their views, under the chairmanship of Lord Robert Cecil. On the morning of the second day, Dr. Charles Carpenter will take part in the proceedings; and the congress will close with a general discussion on labour co-partnership in industry, with special consideration of suggested difficulties.

PROBLEMS OF COMPLETE PURIFICATION.

A long article on this subject appears in the current issue of "The Times Engineering Supplement." The novel arrangement in the South Metropolitan Gas Company's Act is evidently its inspiring cause.

In the course of the article, the following passages appear: Prevailing opinion all goes to show that the problem of removing sulphur compounds from gas is by no means solved. The Carpenter-Evans process marked a great step forward; but it must be borne in mind that, while it removes some 80 p.ct. of the impurities, it does not completely eliminate them. Moreover, very much depends upon the efficiency of the catalytic agent, which appears to fall off to some considerable extent between the periods of regeneration. While, therefore, the method has partly served its purpose, it must not be considered as the final word in purification processes of the kind—more particularly as it is still of an intermittent nature and requires a certain amount of care in operation.

The past two years have been particularly fertile in new suggestions for effecting purification; and many of the proposals are of interest in that they indicate the possibility of evolving means which would be scientifically perfect and readily operated without practical complications. Rideal and Taylor, for instance, have carried the matter a stage further by causing the carbon bisulphide to react with water vapour, instead of with hydrogen as in the Carpenter-Evans process. The desirable effect of this method may best be illustrated by considering the reactions occurring. In the Carpenter-Evans process the reaction is:

$$CS_2 + 2H_2 = 2H_2S + C.$$

In the Rideal-Taylor it is:

$$CS_2 + 2H_2O = 2H_2S + CO_2.$$

It will be noted that, whereas in the former process an objectionable solid (carbon) remains as a residue and chokes the catalyst, in the newer method the residue is in gaseous form. Herein lies the advance; for it is the necessity for burning-off the deposited carbon from the surface of the catalyst, which demands intermittent operation in the Carpenter-Evans process, while Rideal and Taylor realize continuity of action by reason of the fact that the carbon passes out of the plant in the form of a gas. In the Carpenter-Evans process the catalyst employed is costly—namely, nickel reduced from the chloride, while the newer process uses oxide of iron, activated by the addition of a small proportion of oxide of chromium.

The water vapour for the reaction is provided by the admission of a small quantity of steam, passed in with the crude coal gas at the inlet of a preheater which is situated just before the catalyst vessel. It has been found necessary to add only the quantity of steam which is required to prevent the reduction to the metallic state of the catalyst by the reducing action of the gas. For example, at a temperature of 350° C. over 90 p.ct. of the sulphur impurities may be removed by the addition of 7 p.ct. by volume of steam. As in the Carpenter-Evans process, the sulphuretted hydrogen formed by the reaction is subsequently removed in the ordinary way by means of oxide of iron. The temperature of saturation with water vapour and the temperature of the catalyst are dependent upon the composition of the gas, its sulphur content, and the nature of the catalyst employed.

With systems of hot purification, it seems probable that carbon oxysulphide is produced when a gas containing sulphuretted hydrogen and carbon monoxide is treated catalytically. Accordingly, the treatment cannot advantageously be applied to crude gas. Carbon oxysulphide is objectionable even if formed in only small quantities; for it may eventually give trouble in the way of sulphuretted hydrogen stains. This is possibly explained by the fact that when the gas ultimately meets with water, as in the station meters or gasholders, the carbon oxysulphide reacts with the water as follows:

$$COS + H_2O = CO_2 + H_2S.$$

Ammonia, too, may make its appearance at the outlet of the plant, and no doubt results from the hydrolysis of hydrocyanic acid.

It can be only a matter of time before a practical process is developed, by means of which both sulphuretted hydrogen and sulphur compounds are oxidized at high velocity to sulphur or—carrying the process a stage further—to sulphur dioxide. Rideal and Taylor have already gone some way towards the attainment of this ideal.

Three main points stand out—namely, the choice of a suitably activated catalyst which is unaffected by poisoning influences, such as cyanides; the provision of an absolutely tar-free gas; and the provision of an economical source of heat (waste heat if possible) for carrying on the reaction. The high-speed oxidation of sulphur to sulphur dioxide would provide the solution of that will o' wisp of the gas engineer—complete purification. With sulphur dioxide available, it would be comparatively easy to take the process a stage further, and to arrange for the production of ammonium sulphate, or at least sulphite, as a matter of course.

At the meeting to-morrow [Thursday] evening of the Midland Junior Gas Association, in the Council House, Birmingham, Mr. W. J. Pickering, the new President, will deliver his inaugural address.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Programme for the Session 1920-21.

A programme of much and varied interest has been prepared for the forthcoming session of the Association, whose business meetings will be held in the Westminster Technical Institute, Vincent Square, S.W., under the Presidency of Mr. Frank J. Pearce, of the North Middlesex Gas Company. The Hon. Secretary is Mr. George Winslow, of the Gas Light and Coke Company.

1920.

Friday, Oct. 29.—Opening meeting and re-union. Presidential address.

Friday, Nov. 12.—Visit to the show-rooms of the Richmond Gas Stove and Meter Company, Ltd. Demonstrations and discussion.

Friday, Nov. 26.—"Notes on the Effect of Burners and Bars on the Efficiency of the Gas-Cooker Hot-Plate," by Mr. F. S. Larkin, of the Gas Light and Coke Company.

Saturday, Dec. 4.—Visit to the East Greenwich works of the South Metropolitan Gas Company.

Friday, Dec. 17.—"Some Problems in Distribution in the Light of Present-Day Developments of the Gas Industry," by Mr. Stephen Lacey, B.Sc., Distributing Engineer to the Gas Light and Coke Company.

1921.

Thursday, Jan. 6.—Visit to the works of Messrs. W. Parkinson & Co., Cottage Lane, E.C.

Friday, Jan. 21.—"Possibilities of Gas Heating," by Mr. W. Newton Booth, B.Sc. Illustrated by lantern slides.

Friday, Feb. 4.—Visit to the Lots Road, Chelsea, power-house of the London Electric Railway Company.

Friday, Feb. 18.—Subjects for discussion, introduced by Mr. D. C. Cross, Mr. F. A. Frost, and Mr. W. Grogono.

Saturday, Feb. 26.—Annual dinner and concert.

Saturday, Mar. 5.—Visit to the Mill Hill works of the North Middlesex Gas Company.

Friday, Mar. 18.—"Mechanical Problems in a Gas-Works," by Mr. R. C. Macdonald, Chief Mechanical Engineer to the South Metropolitan Gas Company.

Saturday, Apr. 9.—Visit to the Beckton works of the Gas Light and Coke Company.

Friday, Apr. 29.—"A Man's Work," by Mr. John Terrace, Chief Engineer to the South Suburban Gas Company.

Friday, May 13.—Annual general business meeting.

Thursday, June 16.—Visit to the Luton works of the Davis Gas-Stove Company. Ladies' day.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Opening Meeting of New Session.

The opening meeting of the 1920-21 session of the Yorkshire Junior Gas Association took place last Saturday afternoon, at the Fuel Department of the University of Leeds. The President (Mr. J. M'Lusky) occupied the chair; and there was a particularly large attendance of members.

The President, in welcoming the members for the new session, said he noted, with pleasure, the presence of Prof. J. W. Cobb and Prof. Smithells, and expressed the gratitude of the members for being thus honoured. They had had a successful past year, and the Council had arranged a programme which promised another year of success under the new President. It was satisfactory to note the way in which the younger members of the Association were coming forward to take their share of work and responsibility.

Annual Report and Financial Statement.

The Hon. Secretary (Mr. F. Peel, of Brighouse) submitted the annual report, which showed that eight profitable meetings had been held during last session, and that there had been a vast improvement in the attendances. The membership roll was well maintained, totalling 136—an increase of one on that of the previous year. There had been seven resignations, and five names had been removed from the roll by reason of ineligibility. The Council recorded, with regret, the death of one member (Mr. J. E. Sutton, of Bradford). Eight meetings of Council had been held. Congratulations were offered to Messrs. W. W. Atley, W. Carter, A. Coe, C. H. Chester, P. M'Nab, and J. M'Lusky, who had gained promotion during the year.

The Hon. Treasurer (Mr. C. Roper) presented the financial statement, which showed an income of £66 14s. 5d.; the balance in hand after payment of all expenses being £1 18s. 4d., as against a debit balance at the beginning of the year of £19 18s. 3d.

The New President.

Mr. Dougill, on taking the chair, said he was probably the first President of the Association who was not, during his term of office, actually in the gas production. He was, however, engaged in the very closely kindred industry of dyewares manufacture from the products of gas and coke-oven plants. It might be of

ome value to the Association to have a President who was engaged in this very closely related industry.

Office Bearers.

The following officers were elected for the year 1920-21:

President: Mr. G. Dougill, of Heckmondwike.
Senior Vice-President: Mr. P. M'Nab, of Bradford.
Junior Vice-President: Mr. E. A. Leask, of Leeds.
Hon. Treasurer: Mr. C. Roper, of Bradford.
Hon. Secretary: Mr. F. Peel, of Brighouse.
Assistant Hon. Secretary: Mr. F. C. Pykett, of Halifax.
Council: Messrs. E. L. Oughton, of Huddersfield; F. Frith, of Leeds; C. D. Cawthra, of Halifax; and W. Heathcote, of Halifax.

Votes of Thanks.

On the motion of Mr. L. Shaw (Rothwell), seconded by Mr. W. Carter (Hemsworth), a vote of thanks was awarded the retiring officers.

On the motion of Mr. Roper, seconded by Mr. M'Nab, a vote of thanks was passed to the authorities of the Leeds University for the facilities rendered during the session for meetings of the Association and other privileges granted.

Prof. J. W. Cobb acknowledged the resolution, and congratulated himself on seeing one of his own very first pupils now occupying the presidency of the Association.

The President then introduced Mr. Hamilton Davies, B.Sc., Chief Chemist to Messrs. Wilsons and Mathiesons, Ltd., whose remarks, he said, would be of great interest to all in view of the known difficulty of obtaining a steady and silent flame which was sufficiently well aerated.

Silent Aerated Flames.

Mr. Hamilton Davies then delivered an address, illustrated by blackboard tables and diagrams, by lantern slides, and by demonstrations with various types of burners, on "Silent Aerated Flames." The text of the address, together with a report of the discussion to which it gave rise, will appear in a subsequent issue of the "Journal."

Investment Bankers' Committee on Gas Securities.

A report by the Committee of the American Investment Bankers' Association states that there are in operation in the United States over a thousand companies supplying manufactured gas to between 45,000,000 and 50,000,000 people in some 4600 communities. It is estimated that the total capitalization of all the public utility companies in the States is round about $15,000,000,000, and that of this amount something over one-fourth, or approximately $4,000,000,000, is represented by the capitalization of artificial gas companies. That any belief that the gas business as a whole is declining is unfounded, is shown by the fact that the total amount of gas sold has increased from approximately 118,000 million c.ft. in 1908 to more than 300,000 million c.ft. in 1919, or an average annual increase of approximately 13 p.ct.—the rate of annual increase being greater during 1919 than in any preceding year. While it is true that the increase in the use of gas for lighting purposes has not kept pace with the increase for other purposes, nevertheless it is a fact that at the present time the total volume of gas consumed for lighting is much greater than it was in 1908. Gas is pre-eminent in the domestic cooking field; and the industry is undoubtedly on the eve of its greatest development, due to the fact that it is rapidly being employed in increasing quantities for all sorts of industrial purposes where heat is required. Industrial plants must have a flexible fuel, to conform with modern methods of production. Indeed, for heating requirements, which undoubtedly in the aggregate greatly exceed lighting and power needs, gas is in no danger of being supplanted by electricity, as in the heating field gas is fully as clean and convenient as electricity, and vastly more economical. The difference in economy in the use of gas and electricity for heating purposes is fundamental, and is not due to any imperfections in electric heating appliances, which, if 100 p.ct. efficient from the standpoint of converting all the electrical energy consumed into the form of heat, would still be less efficient than gas in utilizing the available heating value in the original solid fuel.

Society of British Gas Industries.—The autumn general meeting of the Society will be held at the Midland Grand Hotel, St. Pancras, on Thursday, Nov. 18. The programme of arrangements will be announced later.

Scottish Junior Gas Association (Western District).—At the opening meeting of the session next Saturday, in the Royal Technical College, Glasgow, Mr. James Jamieson, of Greenock, will deliver his Presidential Address. Subsequent fixtures are: Nov. 6, visit to Messrs. Alder and Mackay's works, Edinburgh. Nov. 20, paper and demonstration by Mr. John M'Isaac, of Glasgow. Dec. 4, visit to the Glenboig Union Fire-Clay Company's works. Dec. 18, paper by Mr. Thomas Orr, of Motherwell. Jan. 8, 1921, smoker. Jan. 22, visit to the Summerlee Iron Company's works, Coatbridge. Feb. 5, paper by Mr. William Bennett, of Mossley. Feb. 12, visit to the Greenock Gas-Works. March 5, paper by Mr. S. H. Hunter, of Glasgow. March 19, joint visit with the Eastern District to the Granton Gas-Works, Edinburgh, April 2, annual general meeting.

JOINTS FOR UNDER-WATER PIPES.

A description of the Ward Duane joint was given by Mr. D. L. Hill, of the Distribution Department of the Toronto Consumers Gas Company, in a paper on "Under-Water Pipes" which he read at the annual meeting of the Canadian Gas Association.

He said that the laying of a 36-inch water-main across the Narrows, New York Harbour, was responsible for the development of perhaps one of the most unique cast-iron joint pipes known. The difficulties encountered were magnified many times over those usually met with, due to the fact that the Narrows is the opening or main entrance to New York Harbour from the ocean. Through it pass the largest vessels afloat, together with all kinds of other water craft, making it one of the busiest channels in the world. It is also the anchorage ground for merchant vessels and ships of war. The under-side of the pipe had to be some 56 ft. below mean low water; and this great depth made it advisable to do as much of the work as possible on the surface. Therefore continuous laying by means of a cradle was adopted in preference to lowering in sections and jointing together at the bottom. The length was nearly 10,000 ft.; and after prolonged study had been given to the design and metal to be used, dense, strong cast iron, as low in graphite carbon as could be obtained, was considered the best material. The pipe was to be made in 12 ft. lengths, with Ward Duane joints, subject to a slight modification which was developed by experiment and test.

The chief points of interest to gas men in connection with the laying of this main are the joint and the methods employed in lowering the pipe into place. The Ward Duane joint is in reality a ball-and-socket joint with lead as jointing material caulked in the usual way. The finished joint will permit of very considerable deflection. Much attention was given to the question of jointing material; but lead was found to be the most satisfactory.

The shrinkage of soft pig lead when cast in such a space, and the shallow effect of even good caulking, was well known and observed experimentally. Even with pneumatic hammers, the lead was found to be consolidated no more than $\frac{3}{8}$ in. to $\frac{3}{4}$ in. from the face of the joint. When a caulked lead joint is moved, as in the deflection of a flexible joint, the effect of the caulking is almost nullified. Lead wool was tried, because it could be caulked strand by strand from the bottom to the face, and being put in cold would not shrink like cast lead. This joint held tight under hydrostatic pressure so high that the cast lead was driven nearly out of the joints in the same line of pipe. But the lead-wool joints were so rigid that the force required for deflection defeated the purpose of a flexible joint.

It was proved that lead would readily flow under a steady pressure of 700 lbs. per sq. in. Advantage was taken of this property of lead by drilling and tapping holes immediately at the back of the hub. Set-screws were then screwed into position, so that the ends, when home, were flush with the inside of the bell. Molten lead was run into the lead space; and, after it cooled-off, the screws were removed and a thick mixture of graphite and mineral grease was forced into the shrinkage space between the lead and bell. Cast-lead plugs 9-16 in. diameter and $1\frac{3}{4}$ in. long were then inserted, one at a time, into each of the 32 holes. The holes were staggered, so that 16 were nearer the spigot end of the pipe. There were three plugs inserted in holes nearest the bell, and four into the latter, making about 22 lbs. of lead per joint. These plugs were easily pumped-in by the screws with a 12-in. wrench; and the quantity could be determined by the graphite and grease oozing-out at the face of the bell.

The joints were made as follows: The inside of the bell was first painted with graphite. The spigot end was then inserted and centred, after which the lead was poured, requiring about 300 lbs. per joint. The lead plugs were then driven with compressed air, after the caulking was done. The joint was then deflected 5°, and tested under 100 lbs. pressure before launching. In laying the pipe, a scow 125 ft. by 40 ft. was used, with a 70-ton derrick for handling the pipe. A cradle or skidway for laying the pipe was suspended from the bow and stern of the scow. It was of structural steel, in the form of a through truss curved in the vertical plane. It was 168 ft. long, 8 ft. wide, and 10 ft. high, and weighed nearly 60 tons. The pipe was held in place by three guides. As soon as a joint was completed, the skidway was drawn ahead, and the finished pipe slipped off into the dredged trench.

The Manchester Association of Engineers are to have a paper on Nov. 27, from Messrs. Fred. J. West, C.B.E., and T. A. Tomlinson, M.B.E., on the subject of "Modern Developments in the Manufacture and Utilization of Coal Gas."

Manchester District Institution of Gas Engineers.—The 188th quarterly meeting of the Institution will take place in Leeds on Friday of next week, Oct. 29, under the presidency of Mr. E. H. Hudson, of Normanton. The members will assemble at 1.30 at the Gas Department workshops in Sovereign Street, which will be inspected on the invitation of the Chairman (Alderman W. Penrose-Green, J.P.), and members of the Gas Committee. At the subsequent business meeting in the Queen's Hotel, Mr. C. S. Shapley will read a paper on "Workshops Organization." At the close of the meeting those present will be the guests at tea of the Chairman (Mr. G. M. Lawrence, J.P.) and Directors of the Normanton Gas Company.

GAS-WORKS EXPEDIENTS.

In a paper which he submitted to the Canadian Gas Association, Mr. R. A. Wallace, Superintendent of the Gas Department of the Quebec Railway, Light, and Power Company, quoted a number of expedients of which he had gathered particulars from different colleagues, for obviating interruption of gas supply in case of trouble arising with the plant. He remarked that small towns are not infrequently provided with only one set of apparatus; and there must be occasions in the gas-man's experience that will call for some rapid thinking and the exercise of a considerable measure of resourcefulness to help him out of the difficulties that are sure to present themselves. The following are some of the methods which he thought might in times of stress be of service to members of the Association.

Collapse of a Storage Holder.

With the collapse of the storage holder (250,000 c.ft.) in a manufacturing city of 15,000 population, the problem was how to restore quickly and maintain the service.

The gas manufacturing plant consisted of two water-gas generating sets of a nominal capacity of 175,000 c.ft. per day each, a 25,000 c.ft. relief holder, two exhausters rated as of 8000 c.ft. per hour capacity each, and a washer, set of purifiers, and station-meter; the three latter being of more than ample size for the then daily requirements.

The gas was sent through the scrubbers, condensers, and tar-extractors into the relief holder. No provision had been made for using the relief as a storage holder for purified gas, nor was there a bye-pass connection to the exhausters. The maximum hourly peak-load demand had at times exceeded 20,000 c.ft.

To meet the situation, a 3-in. pipe with a globe-valve was made to connect the inlet and outlet pipes of the exhausters; and a recording gauge, located in a convenient place for observation, was attached on the pressure or outlet side. The inlet and outlet valves to the washer, station-meter, storage holder, and governor were closed, and the bye-pass valves opened. The purifying material was made lighter to reduce back-pressure.

Both generating sets were kept under fire, and put in action whenever the demand for gas caused a heavy pull on the relief holder, which was kept as full as possible. The gas was pumped by the exhausters from the relief holder, and forced through the purifiers direct into the distribution system—both exhausters being in action at the same time.

A satisfactory pressure on the mains was determined by a study of the record of two pressure gauges—one located at the outlet of the exhausters, and the other at a point some distance from the works. An excess pressure by the exhausters on the street-mains was prevented by opening the valve in the 3-in. pipe, and allowing part of the gas to return to the inlet side. In this way, the town was supplied with gas for eight weeks while the storage holder was being repaired.

Explosion in an Apparatus House.

An explosion wrecked the building in which were housed the exhausters, tar-extractor, purifiers, and station-meter of a carburetted water-gas plant, and more or less seriously damaged all pieces of apparatus, with the exception of one purifier. The gas connections throughout were practically uninjured; but the steam-pipes to the exhausters and to heat the building were put entirely out of commission. The accident happened in the early part of the winter season, while there was sharp frost. The generators, boilers, and holders were intact.

The storage and relief holders, which at that time were large enough to maintain a supply to the district for 36 hours, were both almost fully inflated at the time of the explosion. No gas was lost. It was possible to maintain a fair pressure of gas on the distribution system from the relief holder during the hours of light consumption; the gas being passed under holder pressure through the one purifier to the district.

While arranging to get one exhauster back in service, the stock of gas in the storage holder was held in reserve for peak-load periods (about six hours each day). At other times the supply was kept-up by generating into the relief holder and supplying the street-mains from it through the purifier, as already indicated.

In this way, the service to the town was maintained for forty-eight hours, by which time one of the exhausters had been fitted-up with a belt-drive from an electric motor, and gas was sent out from the storage holder as before the accident. Manufacturing operations were continued for several days with a partially crippled exhauster and one purifier.

To continue operations through the winter, when the temperature would drop to several degrees below zero, temporary wooden structures covered with tar felt were constructed over the exhausters; and the renewed steam-supply pipes were covered with non-conducting material. Two purifiers were fitted with steam heating-coils, and put into commission. To extend the time necessary for changing the material in the boxes, partial revivification *in situ* was provided for by admitting air at the exhauster inlet through a water seal and meter. The tar-extractor and station-meter were not used until the building was reconstructed.

The purifiers and connections were exposed to winter temperatures for fourteen weeks, and rebuilding operations carried on around the apparatus, without any interruption in the supply of gas to the consumers.

Corrosion of a Water-Gas Generator.

When corrosion caused a leak in the angle where the base plate joined the sides of a water-gas generator, allowing steam to leak through during an up-run, and gas to escape on a down-run, a covering of a mixture of Portland cement and fire-clay made a satisfactory repair, which held tight for more than two years.

Meeting an Unexpected Demand.

An unexpected increase in the demand for gas from a small coal-gas works operating a single bench of three retorts temporarily overtaxed the combined storage and producing capacity. To save the situation, a number of pieces of 2-in. pipe, 4 ft. long, were cut and welded-up at one end. These were then filled with coal-oil, and the other end lightly plugged with wet clay. When the charge of coal was burnt off, the retort-lids were opened, the oil-filled pipes pushed in on the hot coke, and the lids quickly closed. The exhauster was speeded-up to increase the pull on the retorts. In this way the supply to the district was maintained, though the output on that occasion was more than double what was ordinarily required.

Leak in a Holder Inlet-Pipe.

A leak of water into the inlet-pipe of a single-lift holder was indicated by the necessity of frequent pumping of the drip, though in the construction of the gasholder tank (which was of brick and cement) a dry well had been provided to accommodate the connections and valves. For some reason both inlet and outlet vertical pipes were partially embedded in the tank wall. A leak also existed in the tank wall where the pipes passed through, allowing water to fill the well.

To determine if the leak into the inlet-pipe was from the outside of the tank or not, the drip was flooded, the inlet-valve was closed, and the flange removed from the top of the vertical pipe. By using an electric light inside the pipe, a trickle of water was noticed from a crack just below the flange of the tee connecting the horizontal with the vertical pipe, about 5 ft. below the top of the wall.

To put a band around the defective tee on the outside or to replace it with another would have necessitated cutting into the tank wall—a risky undertaking. As the pipe (a 10-in. one) was fairly smooth and even on the inside, a block of wood about 2½ ft. long was turned so as to fit tight within the pipe, the centre of the block being bored-out to allow the pump suction-pipe to pass through it; and to give as long a bearing as possible without obstructing the passage, the bottom end of the wood was cut diagonally opposite the tee branch.

The outside of the block was then smeared with thick red lead paint; and it was driven carefully down into the pipe opposite the crack. The leak was stopped, and the pipe so repaired has continued in commission for several years.

Removing a Naphthalene Obstruction.

The inlet-pipe to the single gasholder in a small coal-gas works had become so obstructed with naphthalene deposits as seriously to increase the back-pressure on the system, and render it difficult to maintain the water-seals at the purifiers.

As the usual recourse of steaming from the outside did not remedy the trouble, it was decided that the obstruction had formed in the vertical pipe within the tank. Those who have had experience know that naphthalene does not so readily respond to a second steaming process.

To remove the obstruction, a hole for a 1-in. pipe was tapped in the manhole cover plate on the holder crown opposite the inlet-pipe. A ½-in. hose was then inserted through the hole into the vertical pipe, leaving a sufficient length of hose inside the holder to pass up and down with the holder bell. A quantity of gas-oil was then pumped into the pipe through the hose, steam was applied, and the naphthalene dissolved and pumped out. The outlet-pipe was used as both inlet and outlet during the operation.

Calorific Standard Reduced in Wisconsin.

The local Commission have granted the request (which was the subject of an inquiry lately) of the Wisconsin Gas Association that gas undertakings operating in the State should be permitted to manufacture and distribute gas of an average of 520 B.Th.U., instead of 600 B.Th.U., which has been the rule heretofore. On behalf of the companies, emphasis was laid upon the increasing difficulty of procuring gas oil and the shortage of good gas coal. Further, it was pointed out that the 600 B.Th.U. average caused certain manufacturing and distribution difficulties which might be obviated without detriment to the consumer. While many advantages from the change would accrue to the companies, the consumers would use no more gas than at present. The decision of the Commission requires the gas companies to file monthly detailed reports, and also reserves the right to order a higher standard of gas wherever it might be deemed necessary. On behalf of the City of Milwaukee there was no opposition to the application; the difficulties of the Gas Company in obtaining coal and oil being fully recognized. It was agreed by the authorities that the calorific value of the gas should be lowered simply as an experiment, which if found unsatisfactory could be abandoned. Briefly, the conclusion of the Commission is that it is to the best interests of the consumers that the existing 600 B.Th.U. standard should be suspended for an experimental period; "that the disadvantages to the consumer will be very slight, if any; and that they are far outweighed by the benefits that will be brought about."

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

One-Farthing or 0·2d. Movements Per Therm.

SIR,—Mr. Ibbs's letter does not answer my criticism of his proposals. These were, it will be remembered, based upon:

(1) Convenience to the company.
(2) Convenience to the consumers.
(3) Advantage of price changes by pre-war steps.

As to (1). Mr. Ibbs gives two examples of a sum worked out, in the one case by decimals, and in the other by vulgar fractions, to the advantage of the former. But no well-regulated company, except perhaps of the very smallest size, prepares its accounts in this manner. The charges are all made-up from tables (generally printed) which form part of a rental office's ordinary equipment. It doesn't matter a button whether these are produced by means of vulgar fractions or decimals.

As to (2). You, Sir, have pointed out that one of our important tasks under the new system of charging by therms is our duty to explain its working thoroughly to the gas consumers. Is our success likely to be increased or diminished when, having finished his explanations, the company's official is asked: "What is the price?" and has to make reply: "Eleven decimal two, or eleven point two pence per therm"? He will thus start a further discussion on the decimal system with the consumer, who will most certainly believe it is another device to get something out of him unfairly. If Mr. Ibbs's experience had brought him as closely into personal touch with gas consumers as has mine, I feel sure he would appreciate this.

Then as to (3). It will be remembered that Mr. Ibbs urges the importance of being able to vary therm charges by a smaller fraction of a penny than one-farthing, on the ground that these changes can then be made by the equivalent of penny stages common among some (but by no means all) undertakings in pre-war times. I have pointed out that, if 400 B.Th.U. gas were supplied, a farthing per therm is the exact equivalent of a penny per 1000 c.ft.; and that with 560 B.Th.U. gas, the equivalent figure is only (I give it decimally) 1·4 pence per 1000 c.ft. But Mr. Ibbs overlooks one very vital point—namely, the percentage of difference. With pre-war gas at (say) half-a-crown per 1000 c.ft., the variation by a penny was equal to (another decimal, and a recurring one this time!) 3·3 p.ct. With gas at approximately double the pre-war price, an equivalent percentage would be provided by 0·5 pence per therm with 400 B.Th.U. gas, and by 0·3571428 pence per therm with gas of 560 B.Th.U.—in the one case double, and in the other nearly half as much again as the farthing I have advocated.

I think from the accounting point of view Mr. Ibbs has not made out his case. I am certain he has not from the public standpoint. And, as the chairman of a neighbouring company has pointed out to me, now that the gas industry has swallowed the camel, it is not worth while for it to avoid the gnat.

CHARLES CARPENTER.

South Metropolitan Gas Company,
709, Old Kent Road, S.E. 15,
Oct. 18, 1920.

SIR,—Please permit me to thank Mr. Ibbs for his explanation and comments regarding my article in the "JOURNAL" of last week. I regret that I misunderstood Mr. Ibbs with reference to the adjustment of the slide dividend; and now he has made this point clear, I am quite with him in regard to his remarks. In giving an increment of 5s. or 2s. 6d. in pre-war days, however, Parliament made no adjustment on account of calorific value or candle power, and therefore we need not quibble to-day because odd pence of dividends are gained or lost.

On thinking the matter over further, I am in favour of the 0·2d. fluctuation in price, in view of the greater ease in handling. There is the additional attraction that such a fluctuation would not need any alteration to the dividend increment. This would be a great advantage, inasmuch as the majority of companies sent out gas of round about 500 B.Th.U. in pre-war days, and the many various increments in operation—viz., 5s., 3s. 6d., 2s. 6d., 1s. 9d., 2s. 8d., &c.—would remain unaltered.

The situation, however, can be met in a different manner by standardizing the increment of dividend in terms of one penny per therm. Thus, a company with a 5s. increment would in future have 25s. p.ct. per one penny variation in the therm, or with a 2s. 6d. increment 12s. 6d. p.ct. per one penny per therm variation. It would then be a matter of internal policy whether the advances were made by farthings or fifths of a penny.

There is a further point arising out of the interpretation of the words "production and supply of gas" in the Gas Regulation Act. Most of us are painfully aware of the large increase in floating capital necessitated by post-war conditions. We have to carry bigger stocks, pay for them at a high cost, and the capital so employed is raised at a higher percentage of interest. It appears, therefore, that, in fixing our new standard price, we might justly claim that the term "production and supply" should include sufficient to pay the increased charges, which have, in some cases, grown out of all proportion to the increase in sales of the company, and in many instances have shown a large increase with practically no increase in sales, resulting in a considerable charge on the net revenue of the undertaking. It is not material whether this extra charge is to be distributed by way of mortgage interest or profit to shareholders; and therefore the tabular form issued by the Board of Trade hardly gives scope for the exposition of this claim.

I cannot conceive that a company will be allowed to add to its standard price such charges as interest on bank loan raised in lieu of capital to provide extensions, which therefore should be considered part of profit; but I am of opinion that something should be allowed for increased charges on account of floating capital.

ENGINEER.

Oct. 18, 1920.

Benzole Extraction and Reduction of Naphthalene.

SIR,—I have read with interest the Inaugural Address of the President of the North of England Gas Managers' Association, as reported in the current issue of the "JOURNAL," and also your commendatory editorial remarks thereon.

In fairness to myself, I should like to point out that certain portions of the President's description of his plant for the recovery of benzole and naphthalene, and of its working, almost amount to a paraphrase of the paper that I read before the Midland Association of Gas Engineers in Birmingham on Oct. 1, 1918, which was also reported in the "JOURNAL." Excepting in more or less unimportant details, Mr. Branson's plant is identical with that which was installed at the Etruria Gas-Works and did such valuable service during the war. The working results are also practically the same, except that I went a step further and sublimated the naphthalene.

HAROLD E. COPP.

British Gas Light Company, Hull, Oct. 16, 1920.

Charge per Therm, and a Due Allowance for Loss.

SIR,—Your report in last week's issue of my remarks at West Hartlepool on Mr. Ridley's valuable paper is somewhat at variance with what I at all events intended to say—namely, that some undertakings had installed blue water-gas plant during the war in order to conserve coal, and that they, as well as others who already possessed such plants, were induced by the Government to use them as fully as possible to that end. Consequently, unless due allowance were made for the loss to those undertakings involved in changing-over to the method of charging by therm instead of by volume, they would be penalized permanently for the help they had rendered at the time of need.

I also spoke of the reduction in manufacturing costs which followed on the adoption of this method of working during the war, and the possible disadvantage which might result unless this were taken into consideration in fixing the price per therm.

No doubt the Board of Trade will take account of these considerations. But I would like to add that Mr. Ridley's supposition that pre-war and post-war costs per therm would be suitably adjusted appears to completely dispose of the question; and I hope it may do so eventually. Yet I am not quite sure it will have this effect.

J. KELLY.

Bridlington Gas Company, Oct. 16, 1920.

Gas and Housing Schemes.

SIR,—Referring to the paper and discussion at the Eastern Counties meeting on the subject of gas supplies for housing schemes, there appears to be a disposition on the part of many undertakings to expend more of their capital for giving such supplies than is economically sound, thereby relieving local authorities from paying sums which they are authorized to pay.

I understand a memorandum on the subject will be issued shortly to their members by the British Commercial Gas Association; and I would advise the postponement of decisions until the memorandum is received.

ECONOMIC.

Oct. 16, 1920.

A Congress of Employees.

A scheme has been put into operation by the Reliable Stove Company, of Cleveland (Ohio), under which there is instituted in the factory a representative form of government modelled upon that of the United States, and consisting of an employees' congress, a senate or cabinet, and a supreme court. This plan of "industrial democracy" is said to be working-out to the satisfaction of the management, as well as that of the workers. The congress is composed of twelve members, elected by the employees, who must have been with the Company for a year or longer, and be of legal age and citizens. Foremen are excluded; but women have the right of representation in the ratio of one for each four male members. The term of office is two years; and as the periods are made to overlap, an experienced membership is always assured. Monthly meetings are held, with special ones as required—all after working hours, so that every employee who wishes to attend can do so. The congress is split-up into committees, and its work is to make suggestions pertaining to all phases of management directly affecting the employees. The senate works with the employees' congress in the formulating of such measures as affect the Company's policy or management, and consists of various officers of the Company, whose duty it is to approve or disapprove of the measures passed by the congress. In the event of approval, the matter goes to the cabinet, consisting of the manager and other executive officers deriving their authority from the Board of Directors. The supreme court consists of three members each of the employees' congress, the senate, and the cabinet; and it serves as a court of appeal to interpret the articles of the constitution. The first question to be dealt with was the all-important one of hours and wages; and action has since then been taken with regard to various other matters.

At a meeting of Thurles Urban Council, it was reported that, on account of the disturbed state of the neighbourhood, arising from political and military activity, it was found impossible to get anyone to extinguish the public gas lamps at a specified hour, with the result that they were allowed to remain lighted all night. But, in order to curtail expenditure, the Gas Company were now only lighting the lamps in Main Street, and the centre of the town. A suggestion was made that residents should be asked to turn-off the lights in the respective streets; but it did not meet with favour. Ultimately, it was decided to send a deputation to the Gas Manager, to endeavour to come to some arrangement.

MISCELLANEOUS NEWS.

EAST WEMYSS AND BUCKHAVEN GAS ARBITRATION.

Points Regarding the Purchase of a Small Undertaking.

In the issue of the "JOURNAL" for Sept. 1, intimation appeared of the promulgation of the award arising out of an arbitration held some weeks previously, which had extended over nine days, to determine the price to be paid by the Burgh of Buckhaven, Methil, and Innerleven for the undertakings of the East Wemyss and Buckhaven Gas Light Company, Ltd., and the Leven and Methil Gas Company, Ltd. Some points still remained to be determined; but it is understood that these have now been settled. In this and succeeding issues, therefore, it is intended to place on record some of the principal points that were raised in the course of the lengthy hearing. The cases were taken separately—that of the East Wemyss Company coming first. Here, the Buckhaven Town Council offered £15,498; and the East Wemyss Gas Company asked for £34,902, in addition to £1000 of loose assets. The award fixed the price at £21,050 inclusive. The case for the Company is dealt with to-day.

The arbitration took place in the North British Station Hotel, Edinburgh, with Lord ASHMORE as Oversman. Mr. HENRY WOODALL acted as Arbitrator for the Town Council; and Mr. W. DOIG GIBB, for the Gas Company.

Counsel appearing were: Mr. ALEXANDER MONCRIEFF, K.C., and Mr. J. B. PATON (instructed by Messrs. W. & J. OGILVY SHEPHERD), for the Company; Mr. A. H. B. CONSTABLE, K.C., and Mr. WALTER T. WATSON (instructed by Mr. ROBERT LESLIE and Messrs. PEARSON, ROBERTSON, and MACONOCHIE), for the Town Council. Mr. J. A. STUART was Clerk and Legal Assessor.

THE GAS COMPANY'S CASE.

Mr. *A. Watson Taylor*, who was the first witness called, said he was a Director of the Gas Company, and Clerk to the Wemyss Parish Council. The Company was incorporated in 1908, when the capital was £3750, in £5 shares; but in 1906 and 1907 considerable sums were expended in putting the plant into good condition. These sums came out of profits, and so substantially reduced the average rate of dividend. The old shareholders received £3750 in £1 shares; and later on the capital was increased to £7500. The dividend gradually increased from 5 p.ct. to 10 p.ct., free of tax, after provision had been made for depreciation and reserve. During the years prior to the war, the price of gas varied between 3s. 9d. and 4s. 2d. per 1000 c.ft. There was an accumulated profit fund; but this was never drawn upon for dividends, which for any year were only paid out of profits made in that year. The war had, of course, interrupted the normal course of trading; but the production of gas had considerably increased, after the first drop. The area of supply was largely in a mining district. Before the war, it had been contemplated to run a siding into the works from the North British Railway, which ran along at the back of the works at a considerably higher level. If this scheme were carried out, there would undoubtedly be a considerable saving. The population had been steadily increasing; and the works had been extended to meet these demands. There was now a margin of capacity. Generally speaking, there was promise of a prosperous future.

Mr. CONSTABLE (in cross-examination): The net result of the improvement and extension that has been going on is that you are now claiming a sum in the neighbourhood of £35 000 for the undertaking, which represents about £4 12s. a share. How can you justify asking this price, when the shares have been selling in the market for years at 35s.?

Witness: The burgh wants the undertaking, which has great prospects. We are going on the assumption that our works are worth the value we are asking.

May I put it that you are going on the assumption that you are asking a great deal more than you have any prospect of getting?—No, I do not think so.

Starting from 1913, the leakage was 9 p.ct.; and it goes up to over 20 p.ct., until 1918, when you get it down to 16 p.ct.?—We are now keeping a man specially going about looking after this; and the leakage is being reduced considerably.

Mr. WOODALL: It is rather extraordinary that you are reducing the extra charge to prepayment consumers from 1s. 3d. to 5d. per 1000 c.ft., at a time when all material has risen enormously?

Witness: We arranged with the miners, when we put the fittings in, that we would charge a certain percentage on the gas until the fittings were paid for. There has been a great deal of grumbling. They know the fittings have been paid for; and they want the rates equalized. The Directors think this is only reasonable, and are trying to bring the rates as near together as possible.

What about new prepayment consumers? Do you suggest that 5d. will be enough to cover the extra charge in future?—We think that 5d. is about a fair difference.

Mr. *Alexander Taylor*, the Secretary of the Company, produced the balance-sheets and minutes of the Company; but he was not cross-examined at this stage.

Mr. *William T. Dawson* (another Director of the Gas Company) and Mr. *Andrew Cummings* quoted figures to show that many more houses were required in the district; while Mr. *Alexander C. Dewar* put in a valuation of some property belonging to the Company.

Mr. *John S. Gowans*, chartered accountant, of the firm of Messrs. A. & J. Robertson, who had examined the Company's books and balance-sheets, said the original Gas Company was started some time in the year 1846. In the balance-sheet for the year ended June 30, 1909, there was an entry of the structural valuation of the property, as per valuation of Aug. 6, 1908—the figure being £9553 5s. 11d. Off this sum there had been retained for depreciation £553 5s. 11d., leaving the structural valuation of the property on the assets side at a figure of £9000. Capital expenditure during the year and sundry items made the total entry on that side £9475 14s. 6d. On the liabilities side were the capital holding of the shareholders, entered at £5000; a loan of £1200; and a balance from the profit and loss account during the year £374 11s. 11d. The final figure showed an excess of assets over liabilities of £2901 2s. 7d. He had also examined the accounts for the eleven years since the reconstitution of the Company. The concern was not subject to the provisions of the Gas-Works Clauses Act; and so there was no restriction as to the rate of dividend. The accounts had actually been kept upon the basis of an ordinary commercial trading company; but from the material available, they had been able to re-construct them in statutory form. He had gone into the valuation obtained by the Company in August, 1908, from Mr. W. B. M'Lusky, Gas Engineer at Perth, showing the structural valuation of the property, works, and plant; the total value arrived at being, as already stated, £9553 5s. 11d. The value of works and plant for manufacture, including the manager's house, was given as £4303 4s. 1d.; mains and service pipes, £2786 8s. 7d.; meters, £2012 12s. 1d.; cookers, £271 13s. 4d.; and sundries, £179 7s. 10d. After this valuation, there were considerable extensions and improvements of the property, and subsequent adjustments produced a total of £12,711 6s. 9d. as representing the value appearing in the books at June, 1914. Of course, the depreciation might have been excessive, and the property really have been worth more than this. In fact, adding the preliminary expenses and cost of house fittings written off, the total figure came out at £13,388 10s. 5d. He found, as shown in the Company's accounts, that the profit for the year to June, 1909, was £374 11s. 11d. In 1913, it had risen to £1151 13s.; and in 1914, it was £1079 6s. 4d. In subsequent years, when the war had been exercising its influence, the profits realized were of considerably less amount. Taking it generally, in no year was any dividend declared which had exhausted the profits earned in that particular year. Upon inquiry, he found the highest price ever paid for shares was 36s. each for twenty shares in 1914. In the year to June, 1909, the total gas made was a little over 13 million c.ft., of which about 2 million c.ft. were unaccounted for. By 1914 the manufacture had more than doubled, at 28¾ million c.ft. The unaccounted-for gas had, however, increased from 15·6 p.ct. to 21 p.ct. The immediate result of the war was slightly to diminish the production of gas; and at the date of the last balance-sheet [with 27 million c.ft.] there had not been a complete recovery to the pre-war figure. The unaccounted-for gas reached its highest point—25·8 p.ct.—in 1916; and in later years there had been a considerable improvement. He put in a statement, after reconstructing the accounts, showing the profits realized by the Company upon the statutory system of book-keeping. The figure for 1919 amounted to £757 13s. 2d., and, with fluctuations, reached in 1913 £1887 12s. 11d. In the following year, 1914—being the year in which the notice to treat was served—the profit fell, and was correctly entered at £1599 18s. 5d. Taking the accounts in the same manner, he found that at June, 1914, the accumulated profits had reached £9053 11s. 3d.; and the charges for the year having been paid, there was available at the end of that year to be carried forward the sum of £7562 7s. 4d. By 1919 this figure had slightly increased. The profits brought out in the Company's accounts were substantially smaller than on this statutory basis in practically every year. The Company were really writing-off in each year much more than they required to do. In connection with the recasting of the accounts, he had had the benefit of the assistance of Mr. J. W. Napier and Mr. Alexander Yuill. He contended that, given the appropriate multiplier, the true footing upon which the Company's claim should be measured was with reference to the profit brought out for the year 1914. Of course, if the twenty years' purchase which had been applied in the past was given, this would bring them to the sum claimed.

Mr. CONSTABLE (in cross-examination): I suppose at that rate you have not considered the question of the amount of your claim tested by the market value of the shares, or anything of that kind?

Witness: No. In questions like this you do not test the value, or rather you do not make up your claim, on the basis of the selling price of shares.

Have you ever found a case of the transfer of an undertaking like this where the sum brought out and assessed as the price of the undertaking was so absolutely out of relation to the market value of the shares as this would be?—I could not answer that question right "off the reel." I should require to refresh my memory.

To an ordinary member of the public, it was not apparent on the face of the accounts that this policy was going on of adding to the value of the undertaking by making extensions and improvements out of profits. Would an ordinary member of the public, looking at the annual accounts and balance-sheets, ever have guessed that there was a large surplus being sunk every year in improvement expenditure?—The tribunal must judge of that from the accounts. I did not find any difficulty.

Mr. MONCRIEFF (in re-examination): It has been suggested that by the system of making additions out of revenue, and writing-off depreciation, there was on the part of the Company a certain concealment from the public of the rate of profit which was in fact being earned. Would this concealment also apply in the case of shareholders, and go far to explain the prices which the shareholders were willing to take for the shares they sold?

Witness: Of course, it would.

Mr. *A. W. Robertson Durham*, chartered accountant, of the firm of Messrs. A. and J. Robertson, said he generally concurred with the evidence that had been given by Mr. Gowans. In framing the accounts put in, everything possible had been done to distinguish accurately between capital and revenue charges. As to the multiplier to be applied, prior to the war, his experience was that 25 years was the usual claim in similar circumstances to this. The yield on gilt-edged securities was then about 4 p.ct. At present, the corresponding yield was from 6 to 6¼ p.ct.; and so, unless there were special conditions attaching to the case, he did not think 25 years should be claimed. As regarded special conditions, the majority of the shareholders in the Company were small local people. Having in view the fact that the notice to treat was served in 1914, and that in the ordinary course of events the price would have been paid in that year, he thought the shareholders were entitled to claim the same number of years' purchase as would have been open had the price been paid in 1914. Another special circumstance was the enhanced cost of erecting works to-day.

Apart from the special circumstances, he would suggest (say) 17 years as being equivalent in 1919 to the 25 years claimed in 1914.

Mr. Constable (in cross-examination): You have taken quite properly a certain year (1914), and ascertained the net profit to be £1599. In applying a multiplier, do you not think it is necessary also to have in view the rate of profit before and after the year in question?

Witness: It would be a very fair thing to do, provided the conditions were the same. I do not think any one would contend that the war years would give a fair comparison.

You do not suggest that you are entitled to get secured for more than twenty years in this purchase price?—No. I think twenty years would suit me all right.

Mr. Woodall: You say the shareholders have an income which is maintainable; and you put it at £1600. That is all they have to sell—no more and no less. Do you not think it would be fair to give them this income in debentures in a first-class statutory gas undertaking?

Witness: They have an undertaking to sell; and the measure of arriving at the value of the undertaking is the maintainable profit.

Mr. *J. W. Napier*, Gas Engineer and Manager to the Corporation of Alloa, who was next called, gave evidence as to the capacity and condition of the plant. As to the accounts, from the expenditure figure for 1914 shown at £3898 7s. 1d., he had deducted two items for interest and directors' fees, bringing out a true figure of expenditure at £3855 2s. 4d. From the income figure he had deducted £2 7s. 6d. transfer fees; and taking these corrected figures, he arrived at an increased profit in 1914 of £1640 15s. 8d. Assuming a fair charge for repairs to be 6d. per 1000 c.ft., he found the amount actually expended by the Company was £22 14s. 6d. in excess of this. Therefore he added this sum to his maintainable profit, making it £1663 10s. 2d. At twenty years' purchase, this would permit an award of £33,270 3s. 4d., which, if an allowance for disturbance were to be given, would reach £34,101 18s. 5d. In cases of practically compulsory purchase, it was the custom to allow something for disturbance; but there was no definite evidence as to precisely how much had been allowed. The claim was invariably presented on the terms he had accepted—namely, one-half year's purchase. On the subject of repairs and maintenance, he had taken out the actual figures at Alloa, for the ten years 1909 to 1919; and the average worked out at 5·664d. per 1000 c.ft. In nine other gas-works in Scotland, the average for the four years 1911 to 1914 came out at 5·34d. per 1000 c.ft. The method of estimating the proper sum for repairs as bearing a certain proportion to the amount of gas produced, was the accepted way among engineers. In the case of a large undertaking, the sum would probably be greater than for a small one, because in the former there was frequently a greater amount of moving machinery.

Cross-examined: The figure of cost per 1000 c.ft. of gas sold in his own case gave a very good indication of what the item of repair and maintenance should be. He could not agree that 7½d. per 1000 c.ft. of output was a recognized reasonable figure. He attached great weight to his experience at Alloa, where the works were in excellent condition, and where they were selling the cheapest gas in Scotland. The capital expenditure there was remarkably low. With such great possibilities as the district possessed, the Buckhaven Town Council ought in a few years' time to be in a position to sell gas comparatively cheaply.

Mr. Constable: Was it not a recognized rule—generally recognized, at any rate, up to 1914—that the cost of maintenance and repairs was reasonable if it did not exceed 5 p.ct. of the structural value?

Witness: I accept the figure.

Your figure of 6d. here is less than that by a good deal, and this notwithstanding the large prepayment meter scale?—I accept the figure of 5 p.ct.; but that is on principle. I do not accept it as applicable to these particular works, where one is able to deal with actual figures from year to year, and where one is able to examine the works. For example, this Company in the year 1911 spent no less than 9·62d. per 1000 c.ft. in repairs and maintenance. The average expended by the Company on repairs and maintenance for the five years ended 1914 was 6·31d. per 1000 c.ft. sold; and this figure synchronizes very well indeed with the 6d. I have adopted. Alongside this, you have the data of my own experience at Alloa over a long period of time.

I suggest to you that the expenses of management, properly so called, in the present case were absurdly low, and could not possibly be maintained?—If the East Wemyss Gas Company had paid a substantial salary to a first-class man, they would have had results which would have created such a profit in 1914 as would have yielded a considerably greater sum to the sellers at the present time, and imposed on the Town Council a much larger sum to pay.

Mr. Woodall: One-sixth of the manager's salary was given to me as £23.

Mr. Constable: That is £2 10s. a week; and then there is the house in addition. I put it that it is recognized that a company is economically run if the total management charges do not exceed 1½d. or 1⅜d. per 1000 c.ft. You are down to half that amount here.

Mr. Woodall: You gave us 6d. as the proper figure for repairs and maintenance in 1914. Would you say this was a sufficient amount to spend in a colliery district? I have never known a colliery district where the expenses were not heavier.

Witness: The average of my figures was a little over 5d.; and I have taken the figure of 6d., making an allowance for what might be termed the extraordinary circumstances of mining operations.

Could you tell us what proportion the receipts from residuals bear to the cost of coal at Alloa?—To the best of my recollection, about 60 p.ct.

Here it is about 26¾ p ct.?—I am not suprised.

Mr. Doig Gibb: Do you agree that in practice 10 p.ct. reserve of retort power is quite sufficient? Of course, in smaller works you cannot divide-up retorts?

Witness: Ten per cent. would be suitable.

Therefore you are on the good side if you have 33 p.ct.?—Yes.

(*To be continued.*)

Among other municipal employees, the Broken Hill gas-workers lately came out on strike. The same remark applies to the gas and electricity employees of the Plauen Municipality.

WESTMINSTER PUBLIC LIGHTING CONTRACT.

All Differences with the Gas Company Now Composed.

As reported in the "Journal" for Sept. 22 [p. 625], the subject of the Gas Light and Coke Company's contract for public lighting in Westminster, and their notice to determine it on Jan. 31 next, was referred to the Mayor and certain members of the City Council, to discuss the position with the Company.

A conference took place at which the Company were represented by the Assistant Secretary and Solicitor (Mr. R. W. Foot) and the Controller of Gas Sales (Mr. F. W. Goodenough). The Company put forward a statement of their position; and after some discussion, it was agreed that it be left to the City Engineer to discuss with Mr. Goodenough draft clauses *re* testing of candle power and method of calculating penalties, which the Company submitted, with a view to the provisional settlement of clauses for a new contract.

The Company later wrote to the Council, enclosing a memorandum of the points put forward by them at the conference, and mentioning that any agreement which might be arrived at would be only provisional, and dependent upon a satisfactory solution of the other outstanding questions. Reference was made in the memorandum to the Company's request of May last that the penalty clause in the contract should be suspended for twelve months, in view of the difficult conditions then prevailing. They stated, however, that the supply of material and other matters affecting the contract had now considerably improved, and suggested that the Council should consent to withhold the operation of the penalty clause for six months only as from May 12 last. At the expiration of this period, the Company would be perfectly willing to abide by the contract in all respects—subject to the adoption of their suggestions with regard to the procedure for testing the candle power of lamps, and for calculating the penalties for any deficiencies that might occur. The Company stipulated that this proposal, and the discussions in progress, were to be without prejudice to their notice to determine the existing contract.

Mr. Goodenough subsequently interviewed the City Engineer, and discussed the matter at length. Arising out of the interview, a letter was received from the Gas Company stating that, without prejudice to their position and rights, or to their opinions as to the desirability of a revision of the testing and penalty clauses, but with a view to an early and amicable settlement of the questions that had arisen between the Council and the Company, they were prepared to agree to the following settlement:

(1) The Company to allow the Council a rebate of 2½ p.ct. on the total of their charges to the Council for the year 1920, under the agreement of Jan. 29, 1917, such rebate to be credited to the Council, as to one moiety on the account for the current quarter, and as to the second moiety on the account for the December quarter.
(2) In consideration of such rebate, the Council to waive all claim for penalties in respect of deficiencies in candle power during this year, and to pay all accounts now in arrear as soon as possible.
(3) The Company to withdraw their notice of July 30 terminating their agreement with the Council.
(4) The agreement (subject to the foregoing conditions) to continue in force until Dec. 31 next, and thereafter until twelve months' notice of termination, to expire at any date, be given by either party to the other.

The City Engineer stated that, as the Company agreed to withdraw their notice of termination of the contract, and proposed that determination should be subject to twelve months' notice, instead of six, no further question remained to be discussed.

The Works Committee of the City Council reported that the settlement of the matter now suggested by the Company seemed to be satisfactory; and they recommended its acceptance. The Committee unanimously resolved to record their approval and appreciation of the valuable services rendered by the City Engineer in the negotiations, which had now been brought to such a satisfactory conclusion.

The City Council, at their meeting last Thursday, adopted, without debate, the suggestions of the Works Committee.

MINERS' STRIKE AND GAS SUPPLIES.

Board of Trade Orders.

Last Saturday morning—which was the day of the beginning of the coal miners' strike—the Board of Trade made three Orders relating to lighting and heating, for the purpose of economizing in the use of coal; Mr. W. C. Bridgeman (the Secretary for Mines) having issued a declaration that a state of emergency, as contemplated by clause I. of the Coal (Emergency) Order, 1920, exists.

The Board of Trade published the following:

> In order to assist in the maintenance of essential services during the coal strike, it is necessary to make provision for a reduced consumption of coal in all directions. The Board of Trade, therefore, wish to impress most strongly upon every member of the public that it is his personal duty to cut-down his consumption of coal, gas, and electricity to the lowest possible limit, so as to conserve the stocks of coal that are available. In the event of any consumer being unable to obtain supplies through the usual trade channels, he should apply to the local authority for his district.

Further, the Board of Trade announced that Emergency Orders have been issued:

(1) Requiring gas undertakings to manufacture and supply gas in such a way as will enable them to spread the consumption of their supplies of coal over as long a period as possible, while still supplying gas of serviceable quality.

(2) (*a*) Requiring the discontinuance of all outside advertisement or display lighting on any premises, and also of any inside advertisement or display lighting in shops after closing thereof.
(*b*) Limiting the use of gas and electricity for power.
(3) (*a*) Limiting purchases or deliveries for household consumption to 1 cwt. per week, prohibiting purchases by, or deliveries to, persons who have more than 10 cwt. in stock, and giving power to local authorities to require registration of all consumers, and to cut-off supplies of gas or electricity where there is waste.
(*b*) Limiting the consumption of coal by industrial and business concerns.

Under these Emergency Orders, certain powers are given to local authorities, who will work with the local trade organizations to secure the best result in the public interest.

For the Metropolitan Area, as defined in the Household Fuel and Lighting Orders now suspended, the Secretary for Mines has appointed a Committee representing the various interests, who will deal with all questions of supply and distribution for that area.

It is most important that the questions as to supplies should be referred to, and dealt with by, the local trade organizations, coal and coke supplies committees, and public authorities, and should not be sent to the Secretary for Mines.

From the following explanation of the Orders which has been made by the Board of Trade, it will be seen that the practical effect is to cause a reversion to the conditions in relation to calorific power, pressure, and reduction in lighting that existed during war-time.

With reference to these three Orders issued for the conservation of coal, gas, and electricity supplies, the Ministry of Health have made an Order authorizing any consequent expenditure by local authorities as if it were incurred under the Public Health Acts.

Calorific Power and Pressure of Gas.

The Gas and Coal (Emergency) Order applies to all gas-works throughout the British Isles. It provides that no persons who supply gas under statutory authority or otherwise shall use or permit to be used in the production of gas a greater amount of coal than will suffice to produce gas of a calorific value of 450 B.Th.U. gross per c.ft. With the object of maintaining a supply of gas at adequate pressure during such periods of the day or night when the effective use of it by consumers is most needed, persons who supply it under statutory authority or otherwise shall supply the same at other periods of the day or night at pressures so much lower than those prescribed under any Special Act or Order applying to their undertaking as may be best calculated to secure a supply of gas at adequate pressure during the first-mentioned periods.

All persons supplying gas shall notify the local authority of the district by notice in writing, and shall notify their consumers by newspaper advertisements and placards, of the periods of the day and night during which the pressure of gas will be insufficient to permit of its effective use in consumers' fittings and apparatus. Where any person supplying or offering to supply gas for reward is, by reason of the provisions of the Order, prevented from making a supply or from making a full supply to any consumer, they shall to that extent be relieved of any obligation, whether created by Statute or otherwise, to make such supply. Infringements of the Order are summary offences against the Defence of the Realm Regulations; and it shall be the duty of every local authority as defined in the Coal and Fuel (Emergency) Order, 1920, to administer this Order and enforce the provisions within its district.

Reduction of Lighting.

The Lighting, Heating, and Power (Emergency) Order, 1920, provides that such public lamps as the chief officer of police directs to be kept in use for the public safety shall be maintained, but that it shall be the duty of local authorities to provide that the consumption in their respective area of gas and electricity for public lighting shall be reduced to the minimum that may be deemed necessary. All lights of the following classes and descriptions shall be extinguished and shall not be lighted at any hour.

(*a*) Sky-signs, illuminated facias, illuminated advertisements, and other lights used on, in, or about any premises for the purpose of advertisement or display.
(*b*) Lights used inside any shop for the purpose of advertisement or display when the shop is closed for serving customers.

It is understood that lights must not be used inside or outside for the illumination of windows. Inside lights necessary for the actual conduct of trade may be used while the shop is open, but must be extinguished when the shop is closed, unless the police authorities otherwise direct.

Gas and Electricity for Power.

Where gas or electricity is required for power in any premises within the scope of the Coal (Emergency) Order, its supply and use shall be restricted so that not more than 50 p.ct. of the weekly average quantity supplied or used for power in the four weeks preceding the date of the Order shall be supplied or used in any week after that date, except where it is shown that that weekly average does not afford a fair criterion of the quantity normally supplied, when regard may be had to the quantity used or supplied during the week in 1919 most nearly corresponding in date to that in which power is required. Where it is deemed by a local authority to be expedient in the public interest to do so, the percentage may be increased—such permit to be in writing, and to specify the extent to which the percentage may be increased.

The local authority or its duly authorized officer may direct that any supply of gas or electricity, whether for light, heat, power, or any other purpose, in any premises, whether industrial, business, domestic, or any other description, be diminished or cut-off where there is reason to believe that the supply is being abused or used in excess so as to prejudice the interests of the public. Those responsible for the management of an industry or business shall furnish to the local authority, if and when required to do so, a true and complete statement showing what quantities of gas and electricity respectively were supplied or used for power in such premises during any period or periods as to which information may be required.

Contravention of the provisions of the Order will constitute a summary offence against the Defence of the Realm Regulations; and local authorities and the Secretary of Mines have powers to prosecute for any offence committed.

Stocks of Coal at Gas-Works.

As was indicated in our editorial columns of Sept. 1 [p. 434], the position of gas-works generally in the matter of coal supplies is satisfactory.

The Birmingham Gas Department have a reserve of 60,000 tons of coal, which is equal to about four weeks' supply. The department emphasizes the necessity for a curtailment of the consumption of gas almost immediately. It is quite probable that many industrial works will shut-down if the strike continues; but it is pointed out that this will not have a great effect on the Birmingham consumption, as a very large percentage of the gas sold is for domestic consumption. Every consideration will, Mr. A. W. Smith (the Secretary) states, be given to essential services—such as for railway signals and signal-boxes, gas-heated bakeries, and gas-engines used in cold storage.

Substantial emergency stocks of coal have been accumulated at the Halifax Corporation Gas-Works; and there is now sufficient to enable the department to carry on, with reasonable economy, for several weeks.

At Smethwick, the gas-works have a six-weeks' coal stock; and the Mond gas-works at Dudley Port have sufficient coal and slack to keep the plant going on full load for about a month.

Had the coal strike occurred last winter, the situation would have been serious for the Bradford Gas Department, who were then finding great difficulty in securing supplies. In December they were reduced to four days' supply. Now, however, the department are well situated, having been able to replenish stocks during the summer—particularly in view of the long-drawn-out threat of the coal strike. It is expected that the supplies in hand will be sufficient to outlast the strike.

Every arrangement has been made by the Sheffield Gas Company, so far as it is possible, to meet the condition of things expected to prevail. "We have stocks of coal that will allow us to carry on for five or six weeks," stated Mr. R. Halkett, the General Manager, on Saturday. "That is at the present consumption. On Monday, steps will be taken to reduce pressures in order to conserve to coal stocks and prolong the gas supply. This will be done in the interests of the consumers of gas. It may have the effect of reducing in some small degree the efficiency of the gas supply; but it is hoped the public will take it sympathetically. Every effort will be made to give the best efficiency in the circumstances. Immediately it is possible to do so, the old working will be resumed, when the supply will be ample again. It is expected that the consumption of gas will fall as the big works close-down; and this will allow the undertaking to carry-on for a longer period than would otherwise be the case."

On Monday, the Blackburn Gas Committee, who have a fair supply of coal on hand, decided on an immediate curtailment of the gas supply, by restricting street lighting. Other towns in East Lancashire have taken a similar course; and gas is being reduced both in pressure and in calorific value.

Reports from various towns in Yorkshire indicate that the gas undertakings and the electricity departments are in a much better position than might have been imagined in view of recent circumstances. All departments have been accumulating during the summer, especially since the threat of the coal strike developed. At Leeds, though no statement has been issued as to the actual amount of coal in hand, it is understood that, with care, gas supplies can be maintained for some weeks, though pressure and quality will have to be reduced if the indications point to a protracted strike. Leeds is exceptionally well lighted in the streets; and no serious inconvenience is caused by the immediate reduction of 50 p.ct. in public lighting as an initial economy. Skipton Gas-Works have coal supplies calculated to last at least five weeks, if a stack of 260 tons of emergency coal is counted-in. The Scarborough Gas Company expect to be able to maintain service for five or six weeks on the present standard, though economies will be exercised if the strike threatens to be a long one. The Joint Gas and Electricity Committee at Middlesbrough announce that they have sufficient coal to lead to the hope that gas supplies can be maintained throughout the strike.

BRADFORD CORPORATION GAS DEPARTMENT.

Report of the Gas Committee.

In their report to the Corporation for the year ended March 31, the Gas Committee stated that a full and satisfactory supply of gas was maintained, notwithstanding the great difficulty of obtaining sufficient supplies of coal during the winter months, while the demand for gas "continued to increase, and should soon reach the pre-restriction figures." The accounts for the year show the undertaking to be in a very satisfactory position; and the working results achieved "point to the efficiency of the department generally."

The Committee throughout the year were most anxious to improve the position regarding coal supplies, and were successful in building-up such a reserve that the undertaking can face the coming winter with equanimity—in this respect being much better placed than many other undertakings.

Although confronted with greatly increased costs for coal, materials of all classes, wages, &c., it was not necessary to increase the charges for gas; the present prices—4s. 10d. per 1000 c.ft. for ordinary consumers and 4s. 3d. for power users, less discounts of from 5 to 12½ p.ct. in both cases—having been operative from Oct. 1 last year.

Considerable renewals and maintenance work were necessarily undertaken during the summer; and the whole of the plant at the works is now in a very efficient state and quite capable of meeting all requirements during the coming winter. The vertical carbonization plants at the Thornton Road and Birkshall works have been kept in continuous use, and are still proving highly satisfactory.

The Committee have authorized the purchase of an additional washer-scrubber for ammonia extraction to be erected at the Birkshall

works; and in view of the greatly increased demand for motor spirit, the extraction of benzole has been resumed after having been suspended for some months.

Improving markets for residuals have prevailed throughout the year—pitch and creosote being exceptionally high at the present time. Ordinary coke is selling at the works at 42s. 6d. per ton; and, although considerably higher prices could be obtained for export, the Committee have followed the practice of recent years and disposed of all the production to local consumers. If advantage had been taken of the market, and one-half the coke production had been sold for export, as in the case of certain gas undertakings, an increased revenue would have been obtained sufficient to reduce the present price of gas 50 p ct. A contract for the bulk of the output of tar for a period of five years has been made. As in the expiring contract, the terms were based on the market prices of the residuals derived from the tar, and the undertaking will continue to receive the benefit of advancing market prices.

The Committee have given much consideration to the lighting of the streets, and every endeavour has been made to restore the pre-war standard. The replacement of the lamp tops has proved a very difficult task, owing to the shortage of materials and the inadequate supply of skilled labour; but the number of lamps in use has now been increased to 10,320. In the centre of the city and along main roads lamps are now being left lighted all night.

Authorization has been given for the laying of a number of new mains, chiefly to improve the supply of gas in various districts. During the year ended Aug. 31, 8128 yards of new mains were laid, and 3818 yards were cut off or taken up. The total length of the mains is now over 477 miles.

The value to the undertaking of the show-rooms continues to increase. The sales through this branch increase each year; and the publicity given to the varied uses of gas will repay the expenditure incurred. The latest types of gas appliances for trade and domestic purposes are always before the notice of the general public and are now being more extensively adopted by the consumer.

Report of the Gas Engineer, Mr. Charles Wood.

Mr. Charles Wood, F.C.S., completing forty years' service in the Bradford Corporation Gas Department, congratulates the Gas Committee upon the present sound position of the undertaking. In his report he says that during the year some of their difficulties have been removed, but the cost of materials has steadily risen, and considerable advances of wages have been granted.

The gross revenue for the year amounted to £624,543, and the expenditure to £506,069, showing a gross profit of £118,474. The following charges had to be met: Interest on loans £35,209, contribution to the sinking fund £17,868, income-tax £10,316—a total of £63,393. This left a profit on the year's working of £55,081. Compared with the figures for the preceding year, the gross revenue increased by £130,560; the gross expenditure, by £67,509; and the charges for interest on loans, sinking fund, and income-tax, by £8640. The net profit was £54,411 more than that shown last year, which was £670. The deficit in the net revenue appropriation account has now been reduced to £3000.

During the year £14,471 was spent on capital account for the purchase from the Ministry of Munitions of the benzole plant at the Valley Road works and the oil plant at the Birkshall works, both of which had been erected by the Ministry. The total expenditure on capital to the end of the year was £1,291,030; and the amount provided for the redemption of loans £629,491—leaving £661,539 now outstanding.

Income and Expenditure.

Gas yielded an additional £82,383, brought about by the increase of 10d. per 1000 c.ft., which came into effect from Oct. 1, 1919, and operated on the large quantity that was sold during the six winter months.

The additional income of £18,844 from coke followed its increased value due to the advanced prices of coal.

Tar again showed a large increase—*i.e.*, £22,479. The value of pitch, owing to the great demand both at home and abroad, resulted in the disposal of the whole production at greatly enhanced prices. Good prices were also obtained for further quantities of the pitch the Committee retained from the tar produced during the war, when there was little demand for it. The current financial year will, however, bring the completion of the adjustments under this head.

Less benzole was extracted from the gas, and the receipts thus showed a decrease; while the revenue from ammoniacal liquor was lower, owing to reduced values by reason of sulphate of ammonia prices being controlled and the cost of its production increased.

The gross profit on the chemical works account rose from £3066 in 1919 to £5684 last year.

There were some large increases of expenditure, as was to be expected. The items which showed decreases were relatively small. It is noted that there was a further fall in the amount of bad debts, which had reached the very small figure of £121.

The largest increase was in the cost of coal, which (including carriage and the cost of handling) reached £224,014, or £23,880 more than in 1919-20. On the item for repairs and maintenance of works and plant there was an increase of £17,942. The costs of all classes of materials used and charged under this head considerably advanced, while this item also covered a good proportion of the larger wages bill now borne by the department. The increase in carbonizing wages of £2895 was attributable to the increased production of gas—economies in working having practically balanced the increased rates that were paid. Repairs to mains and services showed an increase of £10,008; the advanced prices of materials used—pipes, castings, &c., and increased wages of workmen—accounting for most of the larger expenditure, although a good deal of work that had been held-over during the war was executed.

Coal.

The quantity of coal carbonized during the year was 153,011 tons, or a decrease, compared with the previous year, of 3387 tons. The average cost per ton was 38. 8·26d. per ton more—29s. 3·37d., compared with 25s. 7·11d. This increase was attributable to the advance ordered by the Controller of Coal Mines in July, 1919, and to the increased charges for carriage from January, 1920.

Throughout the year great difficulty was experienced in obtaining sufficient supplies of coal to keep the plant working. Although a full supply of gas was maintained, at one period during December the coal stocks were down to within four days' requirements. Winter was commenced with very low stocks, these having been depleted in order to maintain a normal supply of gas during the Yorkshire coal strike of August. The outlook [at the date of the report] for the coming winter was much brighter, as during the summer it was possible to replenish stocks; while the average quality of the coal was better.

During the year the works were obliged to accept substantial quantities of Durham coal, instead of that from West and South Yorkshire collieries, although Durham coal is less suitable for gas-making purposes and more costly on account of higher railway rates. Of the coal received 63 p.ct. was from West Yorkshire; 15 p.ct. from South Yorkshire; and 22 p.ct. from Durham.

Under the Coal (Pit's Mouth) Prices Order, 1919, a rebate of 10s. per ton was allowed on all coal supplied for domestic or household purposes from Dec. 1, 1919. The rebate allowed to gas undertakings, according to the proportion which the gas supplied for such purposes bore to the total output, was in the case of Bradford approximately 75 p.ct. The total rebate obtained from the Government through the collieries up to May 11 this year (when the Order was withdrawn) was £31,993; and this sum, with the exception of the 5 p.ct. allowed for administration, was returned to the consumers of gas for domestic or household purposes during the half year ended June 30.

The price of coal was further advanced by 4s. 2d. per ton in May; and by reason of the further increased charges authorized for railway rates and wagon hire, an average additional charge of 2s. 7½d. per ton will have to be met from Sept. 1 of the current year.

Gas Made.

The quantity of gas made during the year was 2,081,390,000 c.ft. compared with 1,967,604,000 c.ft. during the preceding year—an increase of 113,786,000 c.ft. or 5·78 p.ct. The make per ton was 13,602 c.ft., as compared with 12,580 c.ft. the previous year; and was "the highest make per ton on record." Considering that the coal used was much inferior in quality to that used in pre-war years, these figures, says Mr. Wood, are all the more satisfactory.

Gas Sold.

The total quantity of gas sold during the year was 1,894,239,000 c.ft. —an increase of 112,655,000 c.ft. or 6·32 p.ct. During the current year the output has shown a further increase, and "promises to compare favourably with the output of pre-war years—the conditions regarding gas supply now becoming more normal."

The following table shows the quantities of gas sold (with the increase or decrease compared with the previous year's output) for the last few years:

	Gas Sold. Thousands.		Gas Sold. Increase or Decrease per Cent.
1914	2,100,495	..	1·72 increase
1915	2,043,661	..	2·70 decrease
1916	1,808,980	..	11·48 ,,
1917	1,833,171	..	1·33 increase
1918	1,813,618	..	1·06 decrease
1919	1,781,584	..	1·76 ,,
1920	1,894,239	..	6·32 increase

Residuals.

The total quantity of coke produced for sale was 65,117 tons, or 8·51 cwt. per ton of coal. The income, after deducting the cost of handling, cartage, &c., was £94,359, or an average price of 28s. 11·78d. per ton. The demand was well maintained throughout the year, and the whole output was disposed of locally. The price was increased from 30s. to 36s. per ton following the advances in coal prices. Since April it has been found necessary to advance the price of coke, consequent upon the increased cost of coal; and the present price is 42s. 6d. per ton for ordinary coke at the works. Coke has been in such demand for export that £11 to £12 per ton is being realized by many gas undertakings. No coke has, however, been exported from Bradford; the whole of the output having been retained for the use of local customers at comparatively low prices.

During the year 8605 tons of tar were produced, or 10·96 gallons per ton of coal carbonized. The values of pitch and creosote further advanced, and the receipts (partly due to 1914-18 pitch) showed an increase of £22,479 over those of last year.

The quantity of liquor produced was 22,732 tons, or 32·46 gallons per ton of coal.

Plant.

Beyond the purchase of the plants at Valley Road and Birkshall works from the Ministry of Munitions, no capital expenditure was incurred for manufacturing plant during the year. It was found possible to undertake out of revenue a considerable amount of renewal and maintenance work, in order to bring the plant to Bradford's ordinary standard of efficiency. The vertical plants at the Thornton Road and Birkshall works were continuously in use during the year and produced approximately 75 p.ct. of the total gas made. Both installations are giving satisfactory results. Renewal and maintenance work was continued during the summer; and it was expected that all requirements during the coming winter would be met.

Wages and Labour.

Further advances of wages were granted to all sections of the staff and workman; and during the year a shorter working week for gas-workers came into operation. These advances represented a very substantial amount; and although the full effect of the December increase was not shown in the current accounts, the amount paid in wages was £24,357 more than in the previous year, and £88,050 more than the amount paid in 1914. The war wage payable to gas-workers at present is 39s. 6d. per week *plus* 12½ p.ct. bonus on weekly earnings,

and in the case of shift workers an additional 3s. per week in lieu of shorter hours.

MAINS.

In the later years of the war the laying of new mains almost ceased; but last year it was found necessary, in order to improve the supply of gas in various districts, to lay considerable lengths of new main. This work is still going forward, with a view to bringing the mains up to the pre-war standard of efficiency; but the department was still considerably hampered by the inability of the foundry trade to make delivery of the necessary pipes and castings. The mileage of mains at March 31 was 476.

STREET LIGHTING.

During the year the number of lamps in use was increased from 6248 to 9090. Since the withdrawal of restrictions, every possible endeavour has been made to increase the lighting up to the pre-war standard; but it is impossible to obtain the necessary lamp tops or the materials and skilled labour to make them. This difficulty is so acute that there are yet 3000 lamps to fit up. The total number of lamps in use in 1914 was 13,030. The gas used for street lighting during the year was 80,573,000 c.ft.; and the actual total cost to the department was £44,624, towards which the Finance and General Purposes Committee contributed £39,400.

GAS SHOWROOMS.

The Darley Street premises continued to fulfil their purpose, and were proving a very useful adjunct to the department. The sales through this branch showed an increase on the previous year of £4719; and, after meeting all charges, the net cost to the department was only £1463 for the year.

In conclusion, Mr. Wood says: "I am thankful to be able to report that a full and satisfactory supply of gas has been maintained throughout the year; also that no serious breakdown or accident has occurred. The financial and working results have been excellent, considering the many adverse conditions under which we have had to carry on. To-day I complete forty years' service in the Bradford Gas Department; and I trust, therefore, that the Committee will permit me to congratulate them upon the present sound position of their gas undertaking."

OLDBURY GAS-WORKS ACCOUNTS.

Presenting the accounts for the year ended March 31, Mr. Charles H. Carder, the Engineer and General Manager of the Oldbury Urban District Council Gas Department, says that the output of gas shows the great increase of 25·3 p.ct., principally due to a large, but temporary, demand during the year for gas for power and trade purposes; the consumption in this direction increasing by over 36 million c.ft., or 64·6 p.ct. Unfortunately, the unaccounted-for gas also shows an increase from 9·15 p.ct. to 11·85 p.ct., due principally to subsidences. In this connection, one main had eventually to be cut-off at each end and abandoned.

The revenue from the sales of gas shows an increase of 49 p.ct., the increases in revenue from the various grades being: From slots, 15·5 p.ct.; from ordinary consumers, 9·7 p.ct.; and from power consumers, 131 p.ct.

In order to maintain the supply of gas during the winter, a very large proportion of carburetted water gas had to be made, on some days reaching 60 p.ct. of the output, and averaging for the whole year 33·9 p.ct. This was an increase of 126 p.ct. on the volume of carburetted water gas made last year, and necessitated a large increase in the amount of coke used in manufacture, which has been reflected in the lower revenue from residuals during the year. The yield of straight coal gas was 13,171 c ft. per ton, an increase of 580 c.ft. over the previous twelve months.

During the year sanction was obtained for new loan capital for the provision of a new Lancashire boiler and superheater, and for about 1¼ miles of 6-in. and 4-in. high-pressure steel mains for reinforcing the supply of gas to certain districts.

The delivered price of coal has been considerably increased during the year, both by additions to the pit-head price and to railway rates; and though 305 tons less were carbonized, the cost of coal and oil increased by £5283. Wages paid during the year amounted to £15,200, an increase of £4150.

The accounts have been approved by the Council.

STANDARD TESTS OF COOKING APPLIANCES.

The subject of standard tests of cooking appliances was dealt with in a lecture delivered last Wednesday evening at University College by Mr. A. H. Barker, who explained the methods that have been adopted in connection with the extended investigations in this direction that have for a long time been in progress in the college laboratories. The difficulties met with became apparent to the audience as he drew attention to the numerous factors that have to be taken into account in determining "efficiency." With gas, of course, the regulating tap and the meter are invaluable guides in arriving at a fixed basis; but with solid fuels the case is different. However, the importance of saving fuel—even now not realized to the extent it should be—has led the college authorities to persevere in the work.

It was necessary for the purposes of the investigation, to ascertain accurately the amount of heat transmitted from the interior of an oven to any object within the oven; and Mr. Barker exhibited the actual instruments for doing this, and pointed out their principal features. First of all a special closed vessel was placed inside the oven, in the door of which two holes were drilled, and through these holes pipes connected with the vessel were passed. The vessel was filled with water, in which was placed an electric thermometer, so that the temperature of the contents of the vessel could be learned without opening the oven door. In the bottom of the vessel was a small injector, having connected to it a rubber tube (also passing out of the oven), through which air was blown to stir-up the water, and so give the mean temperature, instead of merely the temperature at the point to which the electric thermometer had mounted. On the water reaching boiling-point, the vessel was emptied and filled again with cold water, by displacement, and without opening the oven door; this process being repeated over and over again. At this point, the lecturer declared that the temperature shown by a thermometer placed in an oven in the ordinary way possesses no significance at all.

Later on the vessel already described was superseded by a coil of pipes, through which is passed a perfectly constant stream of water. This constant stream is secured by means of a specially designed tank, so arranged that water under a uniform head passes continuously through an accurately gauged hole. This coil is placed in the oven, also with the two ends passing through the holes in the door; and in the portions of the pipes outside the oven are inserted mercury thermometers, by which can be read the temperatures of both the ingoing and the outcoming water.

One very troublesome factor is the fuel consumption, which, though (as already remarked) quite simply defined in the case of the gas-oven, presents a much more complicated problem where solid fuel is used.

GAS AND ELECTRICITY FOR HOUSING SCHEMES.

A "Piece of Extravagance" at Walsall.

Expenditure which Alderman Pearman-Smith described as "a piece of extravagance which about takes the cake," was criticized at a meeting of the Walsall Town Council, when sanction was given to the borrowing of a further £10,000 for house service cables. It was stated that the money was required in connection with the Blakenall housing scheme, and that a big outlay had been previously agreed to by the Council for the same purpose.

The Mayor (Mr. H. H. Tucker) declined to allow any discussion on the point raised; remarking that the Council had already committed themselves to the principle of providing the new houses with electricity.

Mr. Warner said if the Council provided the electric light for the houses at Blakenall, they should be prepared to give equal facilities as regarded the thousands of other workmen's houses in the town; but Mr. Somerfield contended that it would be waste of time to refer the matter back, as it was now simply a question of raising the money.

Alderman Walker (the Chairman of the Housing Committee) quite agreed that it was a piece of extravagance on the part of the Council to embark on the scheme. There was a dispute as to whether they should instal gas or electricity; and the Council's decision was to provide both—gas for heating and cooking, and electricity for lighting. It was too late to go back on this now, as the houses had been wired. The Council as a whole were responsible for passing it.

Alderman Cope said that the Gas Committee had also given out a contract for laying on gas.

TRADE NOTES.

[For "Journal" Advertisers.]

"Nico" Productions.

The catalogue for 1920-21 of the New Inverted Incandescent Gas-Lamp Company, Ltd., Nos. 19 and 21, Farringdon Avenue, E.C., illustrates and quotes for the complete series of well-known "Nico" inverted incandescent gas burners, mantles, glassware, fittings, indoor and outdoor lamps, silk shades, &c. For the "Nico Flexible" inverted and upright mantles, which are made of a special fabric, extraordinary strength and brilliancy of light are claimed; while the standard "Nico" quality mantles are made of a special woven thread, very highly impregnated, to give the best results. Upright burners and accessories are included in the list.

Welsbach-Kern Radiators.

A catalogue for the forthcoming heating season of the Welsbach-Kern British-made gas-radiators is being issued by the Welsbach Light Company, Ltd., of Gray's Inn Road, W.C. These radiators are constructed upon the principle embodied in the Welsbach-Kern lighting burner—mixture with the gas of the amount of air sufficient to ensure complete combustion. The mixture of air and gas burns in perforated tubes of special composition; and the heat so generated is ejected into the room by radiation. The fires are illustrated in five-tube and ten-tube sizes.

Lamp Controllers.

The Leslie (Fife) Town Council have decided to introduce the "A. & M." pressure wave automatic controllers to the whole of their public gas-lamps. The system will be operated by means of a steam-boosting plant, which has been successfully introduced in a large number of towns throughout the country.

The Dempster-Toogood System.

Pre-war, the Swindon Great Western Railway works required for their very extensive engineering shops considerable quantities of gas for lighting, heating, and general purposes; and this gas was provided by a large installation of horizontal retorts and stoking machinery. During the war great developments took place in the gaseous heat treatment of metals, as a consequence of which their gas requirements considerably increased; and as the cheaper the production of the gas the greater is its application, the choice of plant rested on the same grounds as for a town's gas engineer. The ultimate decision culminated in the order being placed for a 3 million c.ft. per day installation on the "Dempster-Toogood" system of (steamed) continuous vertical retorting, with facilities for extending to 6 million c.ft. Briefly, the installation consists of 48 retorts grouped in two 1½ million c.ft. installations, placed in parallel, and each complete with handling plants for coal and coke, and a coke breaking, screening, and storage plant, with means for cross-connecting either handling plant or screening plant to serve either bench. It is also intended to equip the scheme with coke-washing and briquetting plants, which will make the installation one of the most completely automatic in the country.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Oct.* 18.

There is no particular change to report in the London market for tar products. Pitch remains firm at not below 220s. per ton, f.o.b. makers' works. Creosote is steady at from 1s. 4d. to 1s. 4½d. per gallon, with a considerable amount of inquiry. Tar is also in large demand; there being much present inquiry for export for road work. Pyridine is quiet; makers' price being from 18s. to 20s. per gallon. Pure benzole and pure toluol are about 4s. 3d. per gallon net filled into buyers' drums. Solvent naphtha is about 3s. 6d. per gallon.

The position of sulphate of ammonia remains unchanged.

Tar Products in the Provinces.

Oct. 18.

The average values for gas-works' products during the week were: Gas-works coal tar, 130s. to 135s. Pitch, East Coast, 217s. 6d. to 220s. per ton f.a.s.; West Coast—Manchester, 200s. to 210s.; Liverpool, 200s. to 210s.; Clyde, 205s. to 215s. nominal. Benzole 90 p.ct. North, 3s. 1d. to 3s. 2d.; crude 65 p.ct. at 120° C., 2s. 3d. to 2s. 5d. naked at makers' works; 50-90 p.ct. naked, North, 3s. 2d. to 3s. 3d. Toluol, naked, North, 3s. 1½d. to 3s. 2½d. nominal. Coal tar crude naphtha in bulk, North, 1s. 2d. to 1s. 3d. Solvent naphtha, naked, North, 3s. to 3s. 2d. Heavy naphtha, North, 3s. 1d. to 3s. 3d. Creosote, in bulk, North, liquid, 1s. 0½d. to 1s. 1½d.; salty, 1s. to 1s. 1d. Heavy oils, in bulk, North, 1s. 1d. to 1s. 2d. Carbolic acid, 60 p.ct., 3s. 3d. to 3s. 6d. Naphthalene, £37 10s. to £40; salts, £10 to £10 10s., bags included. Anthracene, "A" quality, 1s. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

The position has undergone very little change since my last report. Most traders have been awaiting something definite with regard to the coal position, and there has been very little inclination for business. Where business has been executed, prices have shown a tendency to advance; but this, again, puts a check on business, as many people believe highest prices have been seen. Pitch is more or less nominal, although still much in request for export. Tars are advanced again; and if pitch falls away, those who are buying tars at current rates stand to lose heavily. Naphthalenes are irregular, with refined lower and crudes fairly steady upon continued demand from the fire-lighter industry. Solvent naphtha is dearer; but heavy is without change. Crude is in some demand, without much alteration in quotations. Benzoles are dearer. Intermediate products are still in request; but makers are well sold forward, and the small imports from America have made no difference to the market. Aniline oil and salts are a trifle lower; and salicylic acid meets fair demand at lower value.

The range of quotations is as follows:

Benzole: 90% London 3s. 5d. to 3s. 7d., North 3s. 4d. to 3s. 6d.; 50-90% 2s. 8d. to 2s. 10d. London, 2s. 7d. to 2s. 9d. North; crude 60-65%, 1s. 7d. to 1s. 9d.; pure, 4s. per gallon naked.

Crude Tar: London, 105s. to 115s.; Midlands, 107s. 6d. to 117s. 6d.; North, 105s. to 115s. per ton *ex* works. Refined tar, 95s. per barrel (free) on rail.

Pitch: London, 225s. per ton f.o.b.; East Coast, 215s. per ton; West Coast, 215s., with Manchester 200s. per ton, and Glasgow 210s. per ton; South Wales, 222s. 6d. per ton.

Solvent Naphtha: London, 3s. 6d.; Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 3s. 6d. per gallon.

Naphthalene: Refined flake, £60 per ton nominal; inferior, £35; crude, £18 to £35 per ton, according to quality.

Toluol: Naked, 2s. 11d. per gallon nominal; North, 2s. 9d.; pure, 4s.

Creosote: London, 1s. 2d. to 1s. 3½d.; North, 1s. 2½d.; heavy oil, 10½d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Pyridine: 20s. to 25s. per gallon.

Aniline Oil: 1s. 8d. per lb., drums extra.

Aniline Salts: 1s. 11d. per lb.

Cresylic Acid: 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. 6d. to 5s. 9d. per gallon *ex* works London, f.o.b. other ports.

Carbolic Acid: Crude 60%, 3s. 4d. per gallon; crystals 40%, 10d. per lb. nominal.

Salicylic Acid: Technical, 2s. 6d.; B.P., 3s. 3d. per lb.

Xylol: Pure, 6s. 9d.; commercial, 5s. 9d. per gallon.

Sulphate of Ammonia.

There has been a falling-off in the export demand, owing to the activities of Continental producers. Orders for supplies for home use are coming in very slowly; but as time advances, a large home consumption is expected. The season's prospects are regarded as distinctly bright. No change is at present noted in export prices. Home quotations are according to the scale of the Sulphate of Ammonia Association—viz., £25 3s. 6d. per ton for standard 24¾ p.ct. quality for 4-ton lots delivered to consumers' nearest station or wharf.

USE Simmance's

DEAD BEAT INDICATORS

instead of WATER-TUBE GAUGES and

"READ THE PRESSURE BY THE POINTER."

No liquid to evaporate and no levels to adjust.

No glasses to break and nothing to clean.

Direct reading, Open scale, Any range (Pressure, Vacuum, or Combination).

Incorrodible, Accurate, for foul or purified gas.

MADE IN MANY RANGES WITH TABLETS LETTERED AS DESIRED.

ALEXANDER WRIGHT & CO., LTD., WESTMINSTER.

Agents: Australia—FYVIE & STEWART, 360, Collins St., Melbourne; Canada—W. P. ROPER, 502, Merchants' Bank Building, Montreal.

Increased Cost of Mond Gas.—At a meeting last Wednesday week of manufacturers in Wallsall and district, who use Mond gas, it was decided to ask the Mond Gas Company to appoint representatives to meet consumers of Walsall, Wolverhampton, and other towns. It was stated by Mr. H. D. Jackson that the price of gas had increased by 433⅓ p.ct. since January, 1914. The effect on the cost of annealing was most severe.

Quality of Gas at Lytham.—The poor supply of gas at Lytham was the subject of an explanation by Mr. J. Chadwick (the new Gas Committee Chairman) recently. He said they were now building retorts which they were advised to renew in 1917; and some time would elapse before these could be put in full working order. The old horizontal retorts were being brought into use; but they were badly cracked. The present plant was inadequate.

Lighting of Surbiton Streets.—Complaints having been received by the Surbiton Urban District Council as to unfortunate results from dimly-lighted streets, Lady Martin urged that the whole of the public lamps should again be brought into use. The matter was referred to a Committee, after it had been pointed out that, in view of the possibility of a miners' strike, it was the duty of all municipalities to study economy in the use of gas, and also that the Council had entered into a contract for limited lighting up to next March.

Securing Coal Supplies in Manchester.—The new Manchester Coal Distribution Committee are busy accumulating stocks for emergency purposes, and so far 2000 tons have been delivered. More has actually been purchased; but the Committee find themselves faced with the common difficulty that all coal has to be allocated by the Lancashire Coal Supplies Committee, who control from Wigan the output of all collieries in its area. The Committee have appointed as their Secretary for the time being Mr. G. W. Kaye, the Secretary of the Gas Department, who had considerable experience of similar work when the Coal Supplies Committee were working in Manchester during the war. Should emergency arise, the city coal merchants will have to apply to him for permits to draw from the accumulated stock.

Gas-Stove Claimed to be Furniture.—It was stated some weeks ago, during an application at the Lambeth County Court for the fixing of the standard rent of four unfurnished rooms at Denmark Hill, that the applicant took the rooms at £2 10s. a week, to include a free supply of gas, and the use of a gas-stove and bathroom. It was subsequently ascertained that the standard rent of the house was £38 a year. Counsel for the defendant argued, however, that the case did not come within the terms of the Act, as the renting agreement included the use of "furniture" in the shape of a gas-stove. The Registrar said he did not think the use of a stove belonging to the gas company could be termed furniture under the Act; but he decided to refer the case to the Judge. Last week, Deputy-Judge Hodges held that the stove was not furniture within the meaning of the Act, and fixed the rent at £1 5s. a week.

Satisfactory Vertical Retort Results at Brechin.—The Brechin Gas Light Company are reducing the price of gas from 6s. 8d. to a flat-rate for all purposes of 5s. 10d. per 1000 c.ft. This reduction is due to the satisfactory results obtained from the new installation of vertical retorts.

Blackpool's Growing Gas Consumption.—Blackpool's big growth in gas consumption continues. The figures for the past half year—that is to say, from April 1 to Sept. 30—show that the consumption was 431,786,000 c.ft., as compared with 408,173,000 c.ft. for the similar period of 1919. This is an increase of no less than 23,613,000 c.ft. It may be mentioned that, at 3s. 9d. per 1000 c.ft., Blackpool's gas is at its highest figure for forty years.

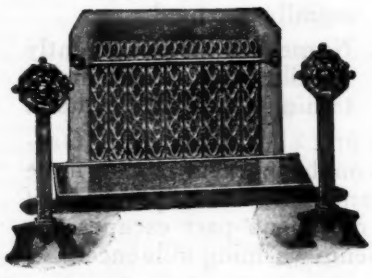
Costs and Profits of Motor Fuel.—"The Times" learns that the final report of the Sub-Committee appointed to inquire into the costs and profits of motor fuel is now practically completed, and will, it is expected, be presented to the Board of Trade towards the end of this month. The last evidence to be taken will be from representatives of the benzole industry. It is understood that the Committee, as was shown in their interim report, are strongly of opinion that the prices of petrol are unjustifiably high.

Showroom "Extravagance."—The Burnley Gas Department recently purchased a shop in the main thoroughfare for the purpose of a showroom, and at a subsequent Council meeting one or two members criticized as extravagant the proposals for decoration and equipment of the premises. The Chairman stated that the Committee had not as yet settled on the scheme. It was, however, their intention to make the showroom as attractive as possible, so that people would call and be induced to purchase utensils useful in gas-cooking, &c. They wanted to encourage the consumers to use more gas.

Dublin Lighting Question.—At a meeting of the Dublin Corporation, in connection with a deficit of £15,000 reported by the Lighting Committee, it was stated that the suspension of lighting each night after midnight, owing to the enforcement of the Curfew regulations under military order, had been responsible for a saving to this amount; and that no further curtailment of lighting was anticipated. Representations made to the Lighting Committee by night workers, that the lights should be turned on when Curfew ended (at 3 a.m.), led to no action being taken. A member explained that the Corporation's resolution fixing the lighting hours would first have to be rescinded; and it was doubtful whether this would, in existing circumstances, be feasible, as the lamplighters would have to be on the streets before 3, and would be liable to arrest as they had not permits, and were asked by the Corporation not to apply for permits. Mr. John Farren, the Chairman of the Committee, has since written to the Press defending the attitude of that body. The only effective alternative, he said, would be to light all the lamps throughout the entire night. But the stoppage of payments due by the Government has forced the curtailment of all public services; and the Corporation are obliged to reduce the amount allowed for public lighting to March 31 next by £15,000. This makes it absolutely impossible to carry out all-night lighting.

Why an "Entente."

SO long as the orthodox type of grate survives there is a reason for an "Entente."



Grates may be of varying proportions, but they can all be satisfactorily converted to gas heating by means of the "Entente" Inset Fire.

It fits neatly, it blends harmoniously, and it heats efficiently. It is the last word in Inset Fire construction.

R. & A. MAIN, LTD.,

WORKS: Gothic Works, EDMONTON, N.18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 6, Narrow Wine Street, BRISTOL; 333, Queen Street, MELBOURNE.

City of Waterford Gas Company.

At the annual meeting of the City of Waterford Gas Company, Mr. John Henry Sugrue, the Chairman, in moving the adoption of the report and statement of accounts, said that the profit, though smaller than in the previous year, had been earned notwithstanding the enormous increase in wages, and the cost of coal and other materials. The actual volume of business done had increased. In view of the great cost of labour and materials, the Company last January made an application to the Board of Trade under the Statutory Undertakings Act, 1918; and they were authorized to charge 7s. per 1000 c.ft. for gas, and the dividend was restricted to 3¾ p.ct. per annum. Owing to further increased costs, they were obliged to make another application last July, and were now authorized to charge 8s. per 1000 c.ft., and to pay the same dividend. The price was fixed to allow this dividend to be earned; but more could not be divided. Coming to details of the accounts, Mr. Sugrue pointed out that the capital expenditure account had been charged with £110 for new mains and services, about £12 for new meters, and £2762 for the water-gas plant, upon which £2021 was taken in as an asset on the unfinished work at June 30, 1919. This plant had enabled them to carry on in spite of the restricted coal supplies. Their carbonizing wages cost £4444, as against £2436 last year and £1075 in the last pre-war year. In addition, they had extra wages on maintenance works and distributing plant. Their coal bill was up by £1560, and the cost of maintenance, wear and tear of mains, and meter repairs had all considerably increased. As a result of the extension of business, but largely because of the need for more floating or working capital to meet the higher costs of material and labour, it was necessary for the Directors to issue the remainder of the Company's stock. The report and statement of accounts were adopted, and the dividend declared. At an extraordinary general meeting, the Directors were authorized to issue all or part of the unissued stock of the Company, and to borrow to the extent of the Company's unexhausted powers from time to time. The Chairman said the Board would now have power to issue the remaining £18,000 of capital; and the stock, when issued, would give them power to borrow a further £5500.

Low-Temperature Carbonization, Ltd.—It is now stated that the Company's plant at Barnsley will be in full operation before Nov. 1. To supply needed capital for the completion and expansion of the works, and to provide labour and coal stocks for the next few months, an issue is being made of £50,000 of 6 p.ct. first mortgage debenture stock at 75 p.ct., carrying an option for six months on 50,000 ordinary shares at par.

Regular Week-End Strike Threatened.—Keighley recently narrowly escaped a stoppage of its gas supply; and the fact is being talked about in connection with the forthcoming municipal elections—trite questions being asked as to how the Labour candidates will face the electors, if heckled on the subject. The trouble came to a climax at the Oct. 9 week-end, when the gas-workers, demanding double pay for all time worked between Saturday noon and Monday morning—a matter which has been referred to the Regional Industrial Council—ceased work on the Saturday noon because the thing they wanted had not happened. They make their claim on the ground that other councils are paying this rate; but these councils were paying increased rates for week-end work before the award of time-and-a-half was made immediately after the threatened strike some while ago. The men, in their attitude, have flouted the advice of their own leaders and their agreement to abide by the decision of the Industrial Council. They returned to work on the Monday morning, when the town's gas supply was almost exhausted; and they threaten to strike in this manner every week-end until their demands are conceded.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Oct. 13.]

Nos. 28,018—28,686.

BARKER, L. S.—"Gas stoves." No. 28,151.
BARRETT COMPANY—"Manufacture of oxidation products of naphthalene." No. 28,473.
CHOWN, J. A.—"Carbonization, distillation, and briquetting of carbonaceous material." No. 28,676.
DUCKHAM, Sir A. M.—"Gas-fired pottery kilns." No. 28,248.
ERNST, E. U. G.—"Gas-stoves." No. 28,109.
GARDNER, J.—"Gas-ring." No. 28,663.
METCALFE, R. C.—"Means for introducing gaseous fuel into combustion chambers of continuous-tunnel kilns." No. 28,339.
MORGAN, J. S.—"Manufacture of coal gas." No. 28,344.
NEEDHAM, J.—"Gas-mixer." No. 28,574.
NEILL, W. G.—"Gas-producers." No. 28,054.
PEASE, E. L.—"Extraction of ammonia from fluids, production of material therefor, and production of ammonia, &c., compounds." No. 28,341.
PERDRISAT, C.—"Apparatus for carburetting gas." No. 28,122.
PERHAM, A. L.—"Liquid-flow meters." No. 28,302.
RUSSELL, D.—See Neill. No. 28,054.
SELAS-TURNER COMPANY.—"Crucible furnaces." No. 28,049.
SELAS-TURNER COMPANY.—"Gas-fires." No. 28,050.
THERMAL INDUSTRIAL AND CHEMICAL (T.I.C.) RESEARCH COMPANY.—See Morgan. No. 28,344.
TURNER, E.—See Selas. Nos. 28,049, 28,050.
WADE, H.—See Barrett. No. 28,473.
WAKELING, T.—See Gardner. No. 28,663.
WESTWOOD, W. W. Skidmore-.—"Gasholders, oil tanks, &c." No. 28,378.
WILDMAN, H.—"Torches or lighters for gas, &c., lamps." No. 28,640.
WILKINSON, G.—"Valves for gas, &c., heating." No. 28,400.
WOODALL, DUCKHAM, AND JONES.—See Duckham. No. 28,248.
WRIGHT, E. T.—See Westwood. No. 28 378.

RICHMOND'S
ST. JAMES
GASFIRE.

The original "R.H.D." (Radiant Heat Distributor) Gasfire, Patent No. 4770/15—first introduced by Richmond's in 1915, marks a definite advance in scientific gasfire construction.

Distinctive in both efficiency and style, the premier advantages are as follows:—

1. **The semi-circular fire-front ensures a perfect distribution of radiant heat to every corner of the room. The whole of the apartment is thoroughly and equally warmed.**
2. **Numerous air ports gently ventilate the room, maintaining a pure atmosphere.**

The first and only series of Gasfires on the market that distribute radiant heat to every corner of the room—no part escapes the hygienic warming influence.

The new design in this series (the "Westminster"), embodying this exclusive principle in construction, will shortly be ready for delivery.

THE RICHMOND
GAS STOVE & METER CO., Ltd.
WARRINGTON —— and —— LONDON

By a small majority, and in the face of strong opposition by the labour party, the Morley Town Council have advanced the salaries of leading officials—including that of the Borough Gas Engineer, from £400 to £500 per annum.

The fire brigade had a call to the West Bromwich Gas-Works, where a fire had broken out in connection with the purifying plant. An hour's work, however, sufficed to extinguish the flames, before serious damage had been done.

"Accidental death from gas poisoning" was the verdict of a Belfast Coroner's Jury in the case of Mary Hall, aged 76, who was found dead in bed with a strong smell of gas in the room. The gas was escaping from a defective pipe in the hall.

A gas explosion in some business premises in Cardiff last Friday morning resulted in some personal injury to a Mr. Simpson and his daughter, and more or less damage to the building. Gas which had accumulated beneath the flooring became by some means ignited.

The Burnley Gas Committee have decided not to resume the lighting of back-street lamps this winter, because of the shortage of coal.

The Association of British Chemical Manufacturers, of No. 166, Piccadilly, W., forward a copy of a brochure on "British Research Chemicals," which has been compiled at the request of the Chemical Society and the Institute of Chemistry acting on behalf of research chemists, and comprises a preliminary list of research chemicals which can be supplied by certain members of the Association. It is pointed out in the introduction to the brochure that the manufacture of fine chemicals is now regarded as a "key industry;" and it is essential that this country should be made independent of foreign sources of supply. The manufacturers will endeavour to meet all the requirements of research workers; and it is intended to issue revised lists from time to time as occasion demands. Copies of the brochure may be obtained on application to the offices of the Association, as given above.

STOCK MARKET REPORT.

THE Stock Exchange has had an agitated week, oscillating between alternate hopes and fears. The opening was dull; but markets kept calm for the most part. The next day brought strong pressure to sell, both on home and on foreign account. On Wednesday, there was evidence of a slackening of the pressure. Hopeful views both as to a miners' settlement and as to money prospects raised their heads; but these fell next day, and the selling was renewed. On Friday, the bolt fell, and the strike materialized. Everything was, of course, very flat; but the final prices were not always the worst of the day.

The gilt-edged market was not so badly hit, and in Home Government issues there was little change, as will be seen from the closing figures of the big four—viz., Consols 45⅝-45⅞, War Loan 84½-84⅝, Funding 67⅜-67⅝, Victory 73⅜-74. Bonds, also, and Corporations held on well. Indian were firmer; but Colonials were not so good. Home rails other than prior charges were easier, and Argentine the same.

In the Foreign market, French were helped up by exchange, but let down again later. Nearly all other movements were adverse, except Japanese. The Miscellaneous market in general was much depressed.

Business in the Gas market made a better show than the previous week so far as activity was concerned, and bargains were more evenly distributed. Prices generally were a little easier, but so little as to indicate market strength to bear up in so troublous a time. Gas Light ordinary eased a point; but the other London companies were unchanged. Among the Suburban and Provincial group, South Suburban, British, and North Middlesex were slightly lower, and, in Foreign, Imperial Continental receded 2 points, and European was fractionally lower. Primitiva was little dealt in, and the quotation unchanged.

Bargains done for cash during the week were as follows: On Monday, Cape Town 7½, European 6⅞, 7, 7⅛, Gas Light Ordinary 51, 51½, 52, ditto preference 55½, ditto debenture 45½, Imperial Continental 130, 130½, 131½, Newcastle and Gateshead 61¾, South Metropolitan 59½, 60, 61, South Suburban 60½, ditto debenture 66½, Tottenham "A" 59, 59¾. On Tuesday, British 20⅝, 20¾, European 6⅞, 7⅛, Gas Light ordinary 50½, 50⅝, 51, 51½, ditto maximum 39½, 39⅝, ditto preference 57, ditto debenture 45⅞, 46½, 47, Imperial Continental 129, 130⅜, Primitiva 9s. 9d., 10s., ditto preference 20s. 6d., 21s. 6d., 22s. 6d., South Metropolitan 60½, ditto debenture 46, 46⅛, 47. On Wednesday, Bournemouth "B" 9, 9¼, Commercial 4 p.ct. 56, Gas Light ordinary 50⅛, 51, 51¼, 51½, ditto preference 55½, Imperial Continental 129, 129⅜, 130, 130½, ditto debenture 85⅛, 85⅜, North Middlesex 7 p.ct. 7⅛, Primitiva 9s. 3d., 9s. 4½d., ditto preference 20s. 6d., 20s. 9d., 22s. 6d. South Metropolitan 58, 58½, 59, 59⅛, 60, 60⅜. On Thursday, British 20⅜, 20⅞, European 6⅞, Gas Light ordinary 50⅛, 51, 51¼, 51½, 51¾, 52, ditto maximum 39, 40, ditto preference 56½, 57, Imperial Continental 129⅛, 130, 130⅛, Metropolitan of Melbourne 94⅜, South Metropolitan 58, 59, 59½, 60. On Friday, Commercial 4 p.ct. 55½, 56, Gas Light ordinary 50½, 51, ditto maximum 39, ditto preference 56, 56½, ditto debenture 46, 46¼, Imperial Continental 129⅛, 130⅛, ditto debenture 86, Primitiva 9s. 3d., San Paulo preference 52, 51⅞, South Metropolitan 59, South Suburban 58⅛.

In the Money Market, the easy condition which had been reached at the close of the preceding week was continued and maintained throughout last week; there being supplies in abundance to meet all requirements. Discount was steady. The Bank rate is 7 p.ct., fixed on April 17.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Aug. 27	4	4%	Aldershot 4 p.c. Pref. .	...	56—61	...
1,551,868	,,	Oct. 14	2½	3⅛%	Alliance & Dublin Ord.	59—64	36—41*	...
374,000	,,	July 14	4	4%	Do. 4 p.c. Deb.	76—79	47—52	...
280,000	5	May 13	7½	8%	Bombay, Ltd. . . .	5⅞—6⅛	4¼—5	...
50,000	10	Aug. 12	16	5%	Bournemouth Gas and Water { 10 p.c. . .	29—30	8—9	...
383,110	10	,,	7	7%	B 7 p.c. .	15—15½	8½—9½	9—9¼
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	7½—8½	...
162,065	—	June 25	—	4%	4 p.c. Deb.	...	62—64	...
992,045	Stk.	July 14	14	30/-	Brentford A Consolid. .	261—266	50—55	...
734,920	,,	,,	11	26/3	Do. B New . .	204—209	47—52	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	68—73	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb. .	91—93	60—63	...
214,775	,,	Aug. 27	11	7½%	Brighton & Hove Orig. .	208—213	120—125	...
244,200	,,	,,	8	5½%	Do. A Ord. Stk.	154—159	78—83	...
1,287,500	Stk.	July 29	5	5%	Bristol 5 p.c. max. . .	...	...	...
530,000	20	Sept. 15	12½	10%	British	44—45	20—22	20⅛—20⅞
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	57—59	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	42—45	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1¼—2½	7—7½	7⅛
100,000	10	,,	—	4½%	Do. 4½ p.c. Pref. .	4—6	5½—6½	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	...
1,513,280	,,	Aug. 12	5/9/4	30/-	Commercial 4 p.c. Stk.	106—108	54—59	55½—56
560,000	,,	,,	5½	26/3	Do. 3½ p.c. do.	103—105	47—52	...
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	45—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	27—32	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—50	...
51,600	,,	Aug. 27	14½	10½%	Croydon A 10 p.c. . .	...	125—135	...
278,400	,,	,,	11½	7½%	Croydon B and C 7 p.c.	..	85—95	...
492,270	Stk.	—	6	5%	Derby Con. Stk. . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17½—18	6½—7½	6½—7½
16,298,975	Stk.	July 29	4/17/4	30/-	Gas Light and Coke { 4 p.c. Ord. . .	98—102	50—53	50½—52
2,600,000	,,	,,	3½	26/3	3½ p.c. max. .	76—79	39—42	39—40
4,062,235	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	55—58	55½—57
4,674,850	,,	June 25	3	3%	3 p.c. Con. Deb.	72½—74½	45—48	45½—47
130,000	,,	Dec. 11	10	10%	10 p.c. Bonds. .	...	...	...
82,500	,,	Sept. 15	5	3½%	Hastings & St. L. 5 p.c.	...	53—58	...
258,740	,,	,,	3½	2½%	Do. 3½ p.c.	87—89	37—39	...
70,000	10	May 13	11	8%	Hongkong & China, Ltd.	16½—16⅝	8½—9½	...
86,600	Stk.	Sept. 15	9	5½%	Hornsey 7 p.c. . . .	...	87—89	...
131,000	,,	Aug. 12	7½	4½%	Ilford A and C . . .	151—154	79—84	...
65,780	,,	,,	6½	3½%	Do. B	115—118	64—69	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb. . .	92—94	55—58	...
4,940,000	,,	May 14	9	4½%	Imperial Continental .	150—160	128—133	129—131½
1,235,000	,,	Aug. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	82—87	85½—86
235,242	,,	Sept. 15	6½	5%	Lea Bridge Ord. 5 p.c. .	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A.	211—213	...	...
						B. 146—148		
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Aug. 12	7/5/6	31½%	Maidstone 5 p.c. . .	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4¼—4⅝	1¾—2¼	...
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	86—93	94¼
541,920	Stk.	May 27	4	6%	Monte Video, Ltd. . .	11½—12	70—75	...
1,875,892	,,	July 29	4½	3½%	Newcastle & Gatsh'dCon.	98½—99½	61—63	61¾
529,705	,,	June 25	3½	3½%	Do. 3½ p.c. Deb.	82—83	50—51	...
15,000	10	Sept. 15	—	8%	North Middlesex 10 p.c.	...	12½—13½	...
55,940	10	,,	7/14/0	5⅜%	,, ,, 7 p.c.	14—15	7—7½	7⅛
300,000	Stk.	May 13	8	8%	Oriental, Ltd. . . .	117—122	98—101	...
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd. . . .	7½—7¾	2—3	...
60,000	50	Aug. 27	13	7½%	Portsea Island, B . .	128—131	65—70	...
100,000	50	,,	12	6½%	Do. C . .	118—121	50—55	...
249,980	5	April 29	8	—	Primitiva Ord. . . .	5½—6	⅛—⅛	9/3—10/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref. .	4¼—5	1—1¼	20/6—22/6
521,600	100	June 1	4	4%	Do. 4 p.c. Deb. .	91—93	69—71	...
600,000	Stk.	July 29	4	4%	Do. ,, ,, 1911	...	40—42	...
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	38—43	...
150,000	10	Sept. 30	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	6½—7½	5⅛—5⅛
125,000	50	July 2	5	5%	5 p.c. Deb.	47—49	36—40	...
135,000	Stk.	Aug. 27	10	5%	Sheffield A	223—224	68—73	...
209,984	,,	,,	10	4%	Do. B	222—224	58—63	...
523,500	,,	,,	10	3½%	Do. C	220—222	53—55	...
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c. . .	...	...	...
90,000	10	Sept. 30	9	9%	South African . . .	10½—11½	10½—11½	...
6,609,895	Stk.	Aug. 12	5/4/0	30/-	South Met. 4 p.c. Ord..	111—113	58—63	58—61
250,000	,,	July 14	—	5%	Do. Pref. . .	...	91—93	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb..	72½—74½	45—47	46—47
224,820	,,	Aug. 27	8½	3%	South Shields Con. Stk.	157—159	95—96	...
1,087,795	,,	July 29	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	58—63	58⅛—60½
247,558	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	65—70	66½
647,740	,,	May 13	7½	3½%	Southampton Ord. . .	99—102	57—60	...
121,275	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61	...
120,000	,,	Aug. 12	—	3½%	Tottenham { A 5 p.c. .	135—138	60—65	59—59½
782,275	,,	,,	6	2½%	District { B 3½ p.c. .	115—117	53—58	...
181,255	,,	June 10	4	4%	4 p.c. Deb.	87—89	60—63	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd. . . .	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Sept. 15	5	3½%	Tynemouth 5 p.c. max.	108½—109	69—71	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Aug. 27	8½	47/6	Wandsworth A 5 p.c.	151—156	75—80	...
255,636	,,	,,	6½	32/6	Do. B 3½ p.c.	129—134	53—58	...
108,075	,,	,,	—	33/3	Do. C . . .	...	50—55	...
140,865	,,	,,	—	33/3	New Ordinary . . .	...	50—55	...
352,000	,,	,,	6½	26/3	Wimbledon 5 p.c. . .	117—122	43—48	...
98,000	,,	,,	6½	32/6	Epsom 5 p.c. . . .	121—126	50—55	...
88,416	,,	June 25	3	3%	3 p.c. Deb. Stk. . .	66—69	44—47	...

* Ex Div.

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(See p. 168.)

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WANTED.—Experienced Manager for Coke Oven Plant, consisting of a Battery of Fifty Regenerative Ovens, Ammonia, Tar, and Benzole Recovery. First-Class Capabilities, Scientific Knowledge, and Practical Experience requisite.
Applications, stating Age, Qualifications, Experience, and Salary required, which would be treated Confidentially, should be addressed to No. 6983, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

COUNTY BOROUGH OF DARLINGTON.
APPOINTMENT OF GAS-WORKS ENGINEER AND MANAGER.

THE Town Council of Darlington invite Applications for the Position of GAS-WORKS ENGINEER and MANAGER.
Applicants, who must be fully qualified, are invited to state the Salary they require.
The person appointed must undertake to Devote the Whole of his Time to the Duties of the Office.
Applications to reach the undersigned not later than the 21st day of October, 1920.
Canvassing will be a Disqualification; but Applicants may, if they wish, send Twelve Copies of their Application and Testimonials to me, for the Information of the members of the Gas-Works Committee.
H. G. STEAVENSON,
Town Clerk.
Town Clerk's Office, Darlington,
Oct. 11, 1920.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.
ASSISTANT DISTRIBUTION ENGINEER.

THE Directors are prepared to receive Applications for the Position of ASSISTANT DISTRIBUTION ENGINEER.
Applicants must have had Practical Experience in all classes of Distribution Work, and in Organizing and Controlling large bodies of Workmen.
Applications, stating Qualifications, Experience, Age, Salary required, and References, to be addressed to the Chairman of the Company, Gas Office, Market Street, NEWCASTLE-ON-TYNE, and received not later than the 25th of October, 1920.
T. HARDIE,
Chief Engineer.

WANTED — Working Manager for small Nottinghamshire Gas-Works. Knowledge of Gas-Engine and Exhauster, Repairs, and Fittings. House, Coal, Light, &c., found.
Apply "A.R.," Levier's Bentinck Building, Wheeler Gate, NOTTINGHAM.

MANCHESTER CORPORATION.
(GAS DEPARTMENT.)

CHEMIST required for Laboratory of the Bradford Road Gas-Works.
Applicants must have had good training in, and experience of, General Analytical work, and possess knowledge of Gas Manufacture and the Treatment of Bye-Products (Sulphuric Acid, Sulphate of Ammonia, &c.).
Salary, £300 per Annum, including Bonus (Civil Service Scale).
Applications, stating Age, Qualifications, and Experience, together with Testimonials, to be addressed to the Chairman of the Gas Committee, Town Hall, Manchester, on or before Wednesday, Oct. 27, 1920.
By order,
THOMAS HUDSON,
Town Clerk.
Town Hall, Manchester,
Oct. 12, 1920.